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Treatment Compatibility of Municipal Waste and Biologically Hazardous Industrial Compounds
Volume II (Appendix A)

Oklahoma State Univ.
Stillwater

Prepared for

Robert S. Kerr Environmental Research Lab.
Ada, OK

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TREATMENT COMPATIBILITY OF MUNICIPAL WASTE AND BIOLOGICALLY HAZARDOUS INDUSTRIAL COMPOUNDS

Volume II (Appendix A)

by

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The overall objective of this research was to gain information on the effect of priority pollutants on the performance of publicly owned treatment works employing activated sludge as the method of secondary treatment. The study was designed to gain information on the effects of a wide array of compounds and to determine the most useful study procedures to be used in assessing effects for the purpose of aiding the Agency in formulating regulatory policy in regard to pretreatment prior to discharge to the publicly owned treatment works.

Batch and continuous-flow bench-scale activated sludge pilot plants were fed settled municipal sewage. The general approach was to compare the performance of control systems with that of comparable systems dosed with various concentrations of priority pollutants. Twenty-four compounds were studied in batch pilot plants; eight of these were also studied in continuous-flow pilot plants operated at a net specific growth rate (μ_n) of 0.2^{-1} (θ_c = 5 days, and four of the eight were also studied in extended aeration pilot plants. Each compound was studied for a period of six months under each mode of operation.

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FOREWORD

The Environmental Protection Agency was established to coordinate administration of the major Federal programs designed to protect the quality of our environment.

An important part of the Agency's effort involves the search for information about environmental problems, management techniques and new technologies through which optimum use of the Nation's air, land, and water resources can be assured and the threat pollution poses to the welfare of the American people can be minimized.

EPA's Office of Research and Development conducts this search through a nationwide network of research facilities. As one of these facilities, the Robert S. Kerr Environmental Research Laboratory is responsible for the management of programs to: (a) investigate the nature, transport, fate and management of pollutants in ground water; (b) develop and demonstrate methods for treating wastewaters with soil and other natural systems; (c) develop and demonstrate pollution control technologies for irrigation return flows; (d) develop and demonstrate pollution control technologies for animal production wastes; (e) develop and demonstrate technologies to prevent, control, or abate pollution from the petroleum refining and petrochemical industries; and (f) develop and demonstrate technologies to manage pollution resulting from combinations of industrial wastewaters or industrial/municipal wastewaters.

This report is a study to evaluate the degree of "susceptibility" of refractory and priority pollutants to municipal waste treatment processes and the impact of this susceptibility on industrial pretreatment technology. The study was designed to gain information on the effects of a wide array of compounds and to determine the most useful study procedure to be used in assessing effects. Both batch and continuous flow bench-scale activated sludge pilot plants were utilized in this effort. The results illustrate that batch pilot-plant operation, although more easily facilitated, cannot be used in place of continuous flow pilot studies as a means of gaining information on which to base pretreatment policy regulations.

Clinton W. Hall
Clinton W. Hall
Director
Robert S. Kerr Environmental Research Laboratory

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PAGE NUMBER
EPA-287 (Cin.)
(4-76)

PREFACE

Economic considerations, as well as the applicability of the process to a wide variety of waste components, have fostered the adoption of biological treatment as the major secondary treatment process for many municipal and industrial wastewaters. Activated sludge is one of the most widely used of the biological wastewater treatment processes. In many cases industries discharge pre-treated or untreated wastes to publicly owned treatment plants where their wastes are subjected to treatment along with the household and commercial discharges comprising the municipal sewage. Some of these industrial chemicals may interfere with the treatment process, thus placing the public's investment in the treatment facility in jeopardy. Alternatively, these compounds may pass unchanged through the plant and find their way to the water resource, where their toxic potential militates against the usefulness of the resource.

Formulation of regulatory policy in regard to discharge of specific potentially hazardous (toxic) chemicals to municipal sewage systems requires a sound base of scientific information in regard to their effect on, and fate at, the municipal treatment plant. The breadth and depth of the required investigational effort is of extremely great magnitude and there are no immediately apparent quick ways to assess effects of specific compounds. The overall goal of the study herein and reported was to contribute to the sound data base needed to formulate regulatory policy with regard to high priority (toxic) pollutants and to compare different methods for obtaining such data. The 24 compounds selected for study in this investigation are among the 129 elements or compounds listed as priority pollutants in the consent decree in NRDC vs. Train 8 ERC 2120.

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PAGE NUMBER
EPA-287 (Cin.)
(4-76)

ABSTRACT

The overall objective of this research was to gain information on the effect of priority pollutants on the performance of publicly owned treatment works employing activated sludge as the method of secondary treatment. The study was designed to gain information on the effects of a wide array of compounds and to determine the most useful study procedures to be used in assessing effects for the purpose of aiding the agency in formulating regulatory policy in regard to pre-treatment prior to discharge to the publicly owned treatment works.

Batch and continuous flow bench-scale activated sludge pilot plants were fed settled municipal sewage. The general approach was to compare the performance of control systems with that of comparable systems dosed with various concentrations of priority pollutants. Twenty-four compounds were studied in batch pilot plants; eight of these were also studied in continuous flow pilot plants operated at a net specific growth rate, (μ_n) of 0.2^{-1} (θ_c = 5 days), and four of the eight were also studied in extended aeration pilot plants. Each compound was studied for a period of six months under each mode of operation.

In batch, only pentachlorophenol and 2-chlorophenol caused increases in soluble residual chemical oxygen demand at feed concentrations of 5 mg/l. None of the eight compounds tested in continuous flow at θ_c = 5 days showed increased effluent soluble COD at the 5 mg/l dosage, but suspended solids concentrations increased in the effluent of the units dosed with phenol and methylene chloride. Higher dosage levels of several compounds led to leakage of soluble COD and higher suspended solids concentrations in the effluent. Effluents from the extended aeration process were better than from comparable systems at the faster growth rate. From the relatively few analyses made for specific compounds, there was no evidence for excessive pass-through of priority pollutants on publicly owned treatment works.

Appendix A was submitted as a supplement to the full report in order to provide the raw data for the numerous experiments conducted.

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3/8"
PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLES

Number		Page
A-1	Control Data for Batch Naphthalene and Toluene Studies . . .	1
A-2	Data for Naphthalene Batch Reactor	4
A-3	Data for Toluene Batch Reactor	6
A-4	Substrate Removal Rate Data for Toluene Batch Reactor. . . .	8
A-5	Substrate Removal Rate Data for Naphthalene Batch Reactor .	9
A-6	Naphthalene and Toluene Batch Stripping Data	10
A-7	Control Data for Batch Benzene & Hexachlorobenzene Studies .	11
A-8	Data for Hexachlorobenzene Reactor	13
A-9	Data for Benzene Reactor	15
A-10	Substrate Removal Data for Hexachlorobenzene Batch Reactor .	17
A-11	Substrate Removal Data for Benzene Batch Reactor	17
A-12	Hexachlorobenzene and Benzene Batch Stripping Data	18
A-13	Control Data for Batch Phenol and Pentachlorophenol Studies.	19
A-14	Data for Phenol Batch Reactor	21
A-15	Data for Pentachlorophenol Batch Reactor	23
A-16	Substrate Removal Rate Data for Phenol Batch Reactor	25
A-17	Substrate Removal Rate Data for Pentachlorophenol Batch Reactor	25
A-18	Phenol and Pentachlorophenol Batch Stripping Data	26
A-19	Control Data for Batch 2-Chlorophenol and Nitrobenzene . . .	27
A-20	Data for 2-Chlorophenol Batch Reactors	31

(continued)

BOTTOM OF IMAGE AREA OUTSIDE DIMENSION FOR TABLES AND ILLUSTRATIONS
BEGIN LAST LINE OF TEXT
6-1/2"
9-1/8"
3/8"
PAGE NUMBER

EPA-287 (Cin.)
(4-76)

Number **Page**

A-21 Control Data for Nitrobenzene Batch Reactors 35

A-22 Substrate Removal Rate Data 2-Chlorophenol & Nitrobenzene Reactor 39

A-23 2-Chlorophenol and Nitrobenzene Batch Stripping Data . . . 40

A-24 Oxygen Uptake Data for 2-Chlorobenzene and Nitrobenzene Reactors 41

A-25 Control Data for Batch Anthracene and 2-Nitrophenol Studies 43

A-26 Data for Anthracene Batch Reactor 47

A-27 Data for 2-Nitrophenol Batch Reactor 51

A-28 Substrate Removal Rate Data for Anthracene & 2-Nitrophenol Reactor 55

A-29 Anthracene Batch Stripping Data 56

A-30 2 Nitrophenol Batch Stripping Data 57

A-31 Control Data for Batch Hexachloroethane and Fluorene Studies 58

A-32 Data for Hexachloroethane Batch Reactors 62

A-33 Data for Fluorene Batch Reactor 66

A-34 Substrate Removal Rate Data for Hexachloroethane and Fluorene Reactors 70

A-35 Hexachloroethane and Fluorene Batch Stripping Data. 71

A-36 Control Data for Batch Methylene Chloride and Carbon Tetrachloride Studies. 72

A-37 Data for Methylene Chloride Reactor 75

A-38 Data for Carbon Tetrachloride Reactor 78

A-39 Substrate Removal Rate Data for Methylene Chloride and Carbon Tetrachloride Reactors. 81

A-40 Methylene Chloride Batch Stripping Data 82

A-41 Carbon Tetrachloride Batch Stripping Data 82

(continued)

BOTTOM OF IMAGE AREA: OUTSIDE DIMENSION FOR TABLES AND ILLUSTRATIONS
BEGIN LAST LINE OF TEXT
PAGE NUMBER
EPA-287 (Cin.)
(4-76)

Number — Page

A-42 Control Data for Batch Chloroform and Trichloroethylene Studies 83

A-43 Data for Chloroform Batch Reactor 86

A-44 Data for Trichloroethylene Batch Reactor 89

A-45 Substrate Removal Rate Data for Chloroform and Trichloroethylene Reactors 92

A-46 Trichloroethylene Batch Stripping Data 93

A-47 Chloroform Batch Stripping Data 93

A-48 Control Data for Batch Chlorobenzene and Tetrachloroethylene Studies 94

A-49 Data for Chlorobenzene Batch Reactor 97

A-50 Tetrachloroethylene Batch Reactor. 100

A-51 Substrate Removal Rate Data for Chlorobenzene & Tetrachloroethylene Reactors 103

A-52 Control Data for Batch Ethylbenzene and 4-Chloro, 3-Methyl Phenol Studies 104

A-53 Data for Ethylbenzene Batch Reactor 106

A-54 Data for 4-Chloro, 3-Methyl Phenol Batch Reactor 108

A-55 Control Data for Batch 1,3 Dichloroethane & 1, 1, 2 Trichloroethane Studies 110

A-56 Data for 1,2 Dichloroethane Batch Reactor. 112

A-57 Data for 1,1,2 Trichloroethane Batch Reactor 114

A-58 Control Data for Batch Bromoform and Tetrachloroethane Studies 116

A-59 Data for Bromoform Batch Reactor 118

A-60 Data for Tetrachloroethane Batch Reactor 120

A-61 Continuous Flow Control Data. θ_c = 5 days. 122

(continued)

BOTTOM OF IMAGE AREA; OUTSIDE DIMENSION FOR TABLES AND ILLUSTRATIONS
BEGIN LAST LINE OF TEXT
3/8"

PAGE NUMBER
EPA-287 (Cin.)
(4-76)

Number		Page
A-62	Data for Benzene Continuous Flow Reactor $\theta_c = 5$ days. . . .	132
A-63	Data for Phenol Continuous Flow Reactor $\theta_c = 5$ days	134
A-64	Data for Phenol Continuous Flow Reactor Extended Aeration .	136
A-65	Data for Nitrobenzene Continuous Flow Reactor $\theta_c = 5$ days .	139
A-66	Data for 2-Chlorophenol Continuous Flow Reactor $\theta_c = 5$ days.	143
A-67	Data for 2-Chlorophenol Continuous Flow Reactor Extended Aeration	147
A-68	Data for Trichloroethylene Continuous Flow Reactor $\theta_c = 5$ days	151
A-69	Data for Methylene Chloride Continuous Flow Reactor $\theta_c = 5$ days	154
A-70	Data for Methylene Chloride Continuous Flow Reactor Extended Aeration	157
A-71	Data for 1,2 Dichloroethane Continuous Flow Reactor $\theta_c = 5$ days	160
A-72	Data for 4-Chloro, 3-Methyl Phenol Continuous Flow Reactor $\theta_c = 5$ days	162
A-73	Data for 4-Chloro, 3-Methyl Phenol Continuous Flow Reactor Extended Aeration	164

6-1/2"

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BOTTOM OF IMAGE AREA; OUTSIDE DIMENSION FOR TABLES AND ILLUSTRATIONS

3/8"

PAGE NUMBER

EPA-287 (Cin.)
(4-76)

SECTION I

INTRODUCTION

The research project was conducted in two major phases which proceeded concurrently. Twenty-four compounds on the priority compound listing were studied in batch pilot plants (Phase I). Eight of these were also studied in continuous-flow pilot plants and four of these were studied in extended aeration systems as well (Phase II).

The experimental period covered two years and each compound was studied for a period of approximately six months. The work was thus divided into four periods of six-months duration in each of which six compounds were studied in batch and two in continuous-flow pilot plants. Undosed control systems were also run in batch and continuous flow operations.

The main line of study was the accumulation and analyses of performance data for the various pilot plants in response to varying dosages and modes of dosage of specific priority pollutants. Auxiliary short-term batch studies were made to assess the rate of purification under various dosages of toxic compounds and to determine the degree of strippability of the priority pollutants under conditions of aeration in the pilot plants.

The data collected during this study were so numerous it was impossible to include it as part of the main report. Therefore, the appendix has been prepared to proved the raw data collected during the two year study.

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PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-1. CONTROL DATA FOR BATCH NAPHTHALENE AND TOLUENE STUDIES

Date	C.O.D.		Solids		
	Before (Total)	After (Soluble)	Before	After	pH
Sept. 1977					
9	56	209	816	772	7.6/7.5
12	56	220	784		7.6/7.5
13	53	241	652		7.5/7.6
14	28	177	776	512	7.7/7.6
16	52	225	616	616	7.4/7.6
19	44	221	512	352	7.3/7.4
21	60	157	632	496	7.3/7.5
23	68		476		7.7
24	92	253	480	372	7.7/7.5
26	68	263	444	488	7.6/7.7
28	42	195	496	464	7/1/7.7
30	42	196	444	424	7.2/7.5
Oct. 1977					
2	34	183	444	400	7.2/7.2
4	38	256	483	460	7.3/7.3
6	48	216	493	431	7.3/7.3
8	37	163	580	512	6.8/7.3
10	45	207	621	572	7.3/7.4
12	64	193	604	576	7.1/7.4
14	68	241	664	608	7.3/7.4
16	56	224			6.9/7.3
18	48	216	868	752	7.3/7.2
20	56	224			7.2/7.1
22	57	241	516	384	7.2/7.0
24	61	196	618	542	7.5/7.1
27	64	247	498	470	7.2/7.1
30	70	189	626	494	7.3/7.2

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EPA-287 (Cin.)
(4-76)

TABLE A-1 (continued)

Date	C.O.D. Before (Total)	C.O.D. After (Soluble)	Solids Before	Solids After	pH
Nov. 1977					
2	84	229	491	370	7.3/7.2
6	36	173	568	526	7.1/7.3
9	40	196	566	546	7.1/7.3
13	52	124	484	404	7.2/7.2
16	70	231	420	395	6.8/6.9
18	68	163	600	545	7.5/6.9
20	48	193	495	465	7.2/7.1
22	48	189	600	545	7.2/7.1
24	56	157	690	580	7.3/7.0
27	55	170	---	---	7.2/7.0
29	32	213	492	388	7.2/7.1
Dec. 1977					
2	55	170	424	396	7.0/7.1
4	47	172	436	348	7.2/6.9
6	63	140	432	---	7.1/7.1
9	23	159	508	336	6.9/7.3
11	20	180	348	324	6.9/7.1
15	--	167	---	532	7.1
16	40	167	548	456	6.1/6.9
17	23	---	608	---	6.0
21	--	---	---	296	7.5
22	--	---	306	336	7.0/7.7
23	--	---	336	---	7.6
26	--	---	---	412	7.2
27	16	199	524	372	7.2/7.4
28	20	---	424	---	7.1

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PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-2. DATA FOR NAPHTHALENE BATCH REACTOR

Date	C.O.D.		Solids		
	Before (Total)	After (Soluble)	Before	After	pH
Sept. 1977					
9	32	214			7.5/7.6
12	61	210		840	7.8/7.6
13	53	229	736	736	7.7/7.6
14	60	216	652	600	7.8/7.6
16	52	221	620	556	7.3/7.7
19	36	237	444	424	7.3/7.3
21	56	149	596	500	7.4/7.4
23	70		420		7.8
24	58	253	480	372	7.7/7.5
26	70	231	384	424	7.7/7.7
28	42	187	532	472	7.1/7.7
30	42	187	540	508	7.3/7.5
Oct. 1977					
2	38	208	448	328	6.3/7.3
4	46	240	526	500	7.1/7.2
6	44	188	516	482	7.3/7.3
8	45	167	504	488	7.0/7.1
10	41	200	488	472	7.2/7.4
12	64	165	548	492	7.1/7.4
14	68	233			7.4/7.4
16	44	184	614	612	6.8/7.3
18	48	176	730	606	7.4/7.2
20	48	212	482	444	7.5/7.1
22	49	216	420	322	7.3/7.1
24	41	196			7.7/7.2
27	60	199	488	418	7.0/7.1
30	58	201			7.2/7.2

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PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-2 (continued)

Date	C.O.D.		Solids		
	Before (Total)	After (Soluble)	Before	After	pH
Nov. 1977					
2	108	249	468	344	7.3/7.1
6	161	157	504	470	7.2/7.3
9	48	172	500	454	7.0/7.3
13	72	116	496	456	7.3/7.2
16	68	165	465	420	6.8/6.9
18	58	177	680	460	7.6/6.8
20	48	193	520	440	7.4/7.2
22	44	201	570	480	7.4/7.1
24	44	173	550	485	7.3/7.1
27	63	190	404	336	7.4/7.
29	47	217	468	420	7.2/7.2
Dec. 1977					
1	59	182	504	338	7.1/7.3
4	39	209	540	340	7.3/7.0
6	41	154	440	424	7.2/7.1
9	22	198	524	316	7.1/7.4
11	20	165	388	332	7.4/7.2
15	--	171	--	440	7.2
16	28	147	504	372	6.2/7.0
17	28	--	468	--	6.2
21	--	--	--	388	7.3
22	--	--	404	336	7.2/7.5
23	--	--	416	--	7.6
26	--	--	--	444	7.2
27	20	183	536	456	7.3/7.3
28	20	--	416	--	7.1

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PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-3. DATA FOR TOLUENE BATCH REACTOR

Date	C.O.D.		Solids		
	Before (Total)	After (Soluble)	Before	After	pH
Sept. 1977					
9	56	222	956	920	7.7/7.6
12	72	236	948	848	7.8/7.7
13	45	204	804	728	7.8/7.7
14	24	201	892	624	7.7/7.6
16	36	221	764	544	7.4/7.6
19	40	225	476	404	7.3/7.4
21	60	145	624	520	7.3/7.4
23	60		580		7.8
24	44	249	572	448	7.4/7.15
26	60	237	520	480	7.6/7.18
28	42	176	584	488	7.1/7.1
30	34	183	585	500	7.2/7.4
Oct. 2	42	187	480	380	6.9/7.2
4	32	220	520	493	7.1/7.3
6	40	180	528	470	7.3/7.2
8	41	163	624	593	7.1/7.2
10	45	179	624	504	7.1/7.3
12	60	171	528	496	7.1/7.3
14	60	205			7.3/7.5
16	44	172	672	798	7.0/7.3
18	40	124	848	612	7.4/7.2
20	36	172	508	500	7.5/7.1
22	69	212	534	386	7.3/7.1
24	53	184			7.6/7.2
27	22	227	446	470	7.1/7.1
30	74	187	626	420	7.2/7.2

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PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-3. (continued)

Date	C.O.D.		Solids		
	Before (Total)	After (Soluble)	Before	After	pH
Nov. 1977					
2	28	225	510	334	7.3/7.2
6	44	221	618	412	7.1/7.2
9	44	228	464	408	7.1/7.2
13	64	164	410	390	7.1/7.2
16	64	161	465	400	7.1/7.0
18	52	181	720	520	7.5/6.9
20	48	171	545	455	7.6/7.1
22	44	177	585	470	7.3/7.0
24	64	193	535	520	7.3/7.1
27	55	178	--	--	7.2/7.2
29	40	233	464	344	7.2/7.2
Dec. 1977					
2	55	170	436	320	7.1/7.2
4	39	181	488	378	6.9/7.0
6	39	154	444	384	7.1/7.1
9	23	190	484	368	7.1/7.3
11	20	190	316	332	7.3/7.2
15	--	175		404	7.0
16	28	135	540	404	6.3/7.0
17	20	--	468	--	6.3
21	--	--	--	452	7.4
22	--	--	460	425	7.1/7.4
23	--	--	512	--	7.5
26	--	--	--	552	7.4
27	16	211	568	512	7.2/7.3
28	16	--	568	--	7.3

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PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-4. SUBSTRATE REMOVAL RATE DATA FOR TOLUENE BATCH REACTOR

	Control		Toluene		Toluene	
Time Hr.	Soluble COD	Solids	Soluble COD	Solids	Soluble COD	Solids
Test 1			(30 mg/l)		(50 mg/l)	
0	255	132	247	104	247	128
1	215	164	231	116	231	112
2.5	247	224	219	140	207	140
4.25	187	188	191	136	195	152
6.0	215	196	163	156	167	160
8.0	88	220	139	164	151	200
8.75	--	232				
9.75			80	196	96	204
9.50	76	240				
10.75			--	200	--	216
10.5	--	232				
11.5			60	192	76	224
12.0	--	232				
12.5				196	--	224
13.0	56	228				
14.0				184	--	188
26.0	56	100				
15.0			--	160	76	120
28.0			56	116	68	--
Test 2			(50 mg/l)		(100 mg/l)	
0	262	126	278	130	282	132
1.67	231	140	231	132	223	132
2.85	231	140	246	160	223	152
4.67	188	156	184	152	192	214
6.67	192	268	176	172	188	264
10.42	90	172	67	212	110	208
11.67	78	212	59	228	90	228
13.67	67	236	70	220	78	232
15.92	59	244	82	232	67	240
17.92	67	236	67	224	67	228
26.17	55	220	74	208	67	212

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3/8"
PAGE NUMBER

EPA-287 (Cin.)
(4-76)

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TABLE A-5. SUBSTRATE REMOVAL RATE DATA FOR NAPHTHALENE BATCH REACTOR

	Control		Naphthalene		Naphthalene	
Time Hr.	Soluble COD	Solids	Soluble COD	Solids	Soluble COD	Solids
Test 1			(30 mg/l)		(50 mg/l)	
0	243	136	267	104	247	126
1	179	180	219	124	219	124
2.5	167	192	195	156	215	188
4.25	155	192	175	176	171	168
6.0	112	196	--	172	147	172
8.0	84	236	143	216	120	152
8.75	--	244				
9.75			116	200	80	148
9.50	76	236				
10.75			--	212	--	160
10.5	--	240				
11.5			80	220	72	188
12.0	--	244				
12.5			--	224	--	188
13.0	68	212				
14.0			--	224	--	180
26.0	56	216				
15.0			68	204	56	176
28.0			64	--	48	264
Test 2			(50 mg/l)		(100 mg/l)	
0	274	144	278	126	262	126
1.67	219	208	227	160	227	148
2.85	200	160	246	160	207	156
4.67	200	172	184	168	180	156
6.67	192	192	172	192	168	180
10.42	117	188	90	232	113	228
11.67	94	224	70	244	98	228
13.67	63	244	74	240	74	236
15.92	63	256	59	252	66	236
17.92	55	240	55	236	78	188
26.17	51	232	66	228	78	228

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3/8"
PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-6. NAPHTHALENE AND TOLUENE BATCH STRIPPING DATA

Theoretical COD	NAPHTHALENE			TOLUENE		
	250 250 mg/3 lit.	500 500 mg/3 lit.	1000 1000 mg/3 lit.	250 .28 ml/3 lit.	500 .56 ml/3 lit.	1000 1.11 ml/3 lit.
Time	COD	COD	COD	COD	COD	COD
Test 1						
0	215	227	493	52	95	258
5 min.	--	--	--	44	53	99
10 min.	143	262	588	24	29	50
15 min.	--	--	--	20	25	32
20 min.	155	353	537	--	--	
30 min.	175	389	572	20	21	28
1 hour	95	254	508	24	16	28
1.5 hour	--	--	--	24	24	24
3 hour	67	103	387	--	--	--
6 hour	40	32	175	16	20	32
12 hour	28	24	100	36	28	36
18 hour	20	12	59	16	28	32
21 hour	24	8	27	24	4	28
Test 2						
0	154	330	334	42	62	118
5 min.	--	--	--	58	60	92
10 min.	--	--	--	38	44	42
15 min.	--	--	--	30	26	30
30 min.	--	--	--	34	34	30
1 hour	162	226	419	30	30	34
3 hour	86	98	152	--	--	--
6 hour	64	84	176	--	--	--
12 hour	--	--	--	30	26	26
14.5 hour	14	22	45	--	--	--
18.5 hour	22	14	40	--	--	--
21 hour	14	18	24	--	--	--

Air Flow Rate = 4 CFH, Volume of Reactor = 3 liters.

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BOTTOM OF IMAGE AREA; OUTSIDE DIMENSION FOR TABLES AND ILLUSTRATIONS
EPA-287 (Cin.)
(4-76)

TABLE A-7. CONTROL DATA FOR BATCH BENZENE & HEXACHLOROBENZENE STUDIES

Date	C.O.D.		Solids		
	Before (Total)	After (Soluble)	Before	After	pH
September 1977					
13	46	218	464	304	7.4/8.0
14	34	194	374	338	7.6/7.6
15	40	253	366	274	7.4/7.6
17	28		354	316	7.3/7.7
19	40	369	358	254	7.3/7.3
21	32	253	432	340	8.0/7.9
24	36	229	354	260	7.6/7.5
26	56	274	386	266	7.6/7.7
29	60	182	324	256	7.1/7.6
October 1977					
1	40	196	448	292	7.46/7.56
3	36	136	346	269	7.4/7.73
5	44	176	422	384	7.37/7.74
6					7.66/7.85
7	49	203	358	276	7.48/7.59
8					7.38/7.53
9	45	195	390	340	7.35/7.67
11	41	179	304	360	7.94/7.75
13	56	249	428	352	7.37/7.81
15	68	233	516	440	7.86/7.80
17	52	228	452	356	7.68/7.52
19	44	220	384	308	7.7/7.56
21	23	239	380	292	7.87/7.41
23	36	233	396	312	7.98/7.76
25	32	224	340	272	7.86/7.35
27	40	227	360	280	7.64/7.15
29	50	179	440	380	
31	24	192	640	404	7.5/7.6

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PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-7 (Continued)

Date	C.O.D.		Solids		
	Before	After	Before	After	pH
Nov. 1977					
2	30	264	460	380	7.3/7.4
4	40	220	368	320	7.3/7.1
6	52	188	484	364	7.5/7.1
8	44	392	356	348	7.5/7.2
10	20	128	440	340	7.9/7.2
12	56	304	416	332	7.6/7.1
14	36	---	456	368	7.3/6.8
16	40	217	448	364	7.2/6.8
18	36	258	584	496	7.4/7.1
20	40	173	476	388	7.5/7.1
22	36	265	496	424	7.6/7.1
24	88	277	472	388	7.4/7.2
26	83	170	520	420	7.3/7.4
28	40	174	480	412	7.3/7.7
30	51	194	568	344	7.2/7.2
Dec. 1977					
2	43	194	556	408	7.2/7.2
4	53	232	620	352	7.5/7.2
6	68	205	508	380	6.9/7.1
8	74	230	544	344	7.2/7.1
10	24	215	536	296	7.3/7.6
12	20	175	400	312	7.5/7.1
15	--	215	---	352	------
16	28	191	524	436	7.5/7.1
17	32	207	452	460	7.6/7.1
21	--	---	---	424	
22	--	157	460	---	7.5/7.2
23	39	188	568	420	7.6/7.2
27	12	183	740	464	7.2/7.3
28	20	---	516	---	7.38

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PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-8. DATA FOR HEXACHLOROBENZENE REACTOR

Date	C.O.D. Before (Total)	C.O.D. After (Soluble)	Solids Before	Solids After	pH
Sept. 1977					
13	50	226	280	276	7.4/7.9
14	26	222	330	320	7.7/7.6
15	40	193	486	242	7.4/7.4
17	36		332	296	7.4/7.8
19	36	442	344	230	7.3/7.3
21	40	209	472	326	7.9/7.9
24	44	237	340	226	7.6/7.5
26	24	262	456	322	7.6/7.7
29	44	150	376	368	7.1/7.1
Oct. 1977					
1	28		364	302	7.3/7.73
3	36	184	330	284	7.3/7.37
5	24	148	434	396	7.32/7.65
6					7.65/7.77
7	37	193	378	308	7.38/7.45
					7.35/7.63
9	32	195	342	280	7.33/7.45
11	32	167			7.77/7.42
13	56	233	480	400	7.37/7.47
15	68	262	552	412	7.45/7.47
17	52	236	428	356	7.54/7.50
19	44		424	332	7.50/7.43
21	48	227	344	316	7.54/7.45
23	32	219	352	296	7.87/7.44
25	36	220	388	328	7.67/7.33
27	38	233	408	352	7.58/7.46
29	38	199	512	404	
31	32	232	480	432	7.3/7.5

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PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-8. (Continued)

Date	C.O.D. Before (Total)	C.O.D. After (Soluble)	Solids Before	Solids After	pH
Nov. 1977					
2	24	224	460	368	7.2/7.5
4	30	190	524	412	7.1/7.1
6	30	206	456	396	7.3/7.1
8		212	480	376	7.3/7.2
10	40		636	400	7.8/7.2
12	48	308	436	388	7.6/7.1
14	28	197	500	392	7.3/7.0
16	44	223	496	380	7.2/6.7
18	42	221	516	332	7.3/7.1
20	42	237	408	376	7.2/7.0
22	126	177			7.5/7.0
24	36	193			7.4/7.1
26	32	162	660	444	7.4/7.2
28	43	166	472	424	7.9/7.2
30	59	178	488	408	7.3/7.1
Dec. 1977					
2	40	166	432	432	7.3/7.0
4	59	230	664	388	7.6/7.2
6	74	195			5.9/7.0
8	59	229	480	376	7.2/7.0
10	36	211	516	368	7.3/7.2
12	24	135	440	380	7.4/6.9
15		223			
16	28	187	624	452	7.6/7.0
17	28	239	632	412	7.7/7.1
22	51	171	440	432	7.4/7.2
23	47	176	492	372	7.7/7.2
27	16	175	464	412	7.2/7.3
28	16	---	420	---	7.41

EPA-287 (Cin.)
(4-76)

TABLE A-9. DATA FOR BENZENE REACTOR

Date	C.O.D.		Solids		
	Before (Total)	After (Soluble)	Before	After	pH
September 1977					
13	38	214	352	284	7.5/7.8
14	26	206	334	296	7.6/7.8
15	44	229	458	234	7.4/7.6
17	40	---	362	320	7.3/7.7
19	40	341	368	282	7.3/7.3
21	40	221	444	320	7.9/7.8
24	40	229	360	258	7.7/7.5
26	32	233	394	350	7.6/7.7
29	44	172	352	332	7.0/7.5
October 1977					
1	24	172	376	304	7.4/7.75
3	34	112	356	246	7.3/7.75
5	24	176	372	362	7.41/7.73
6					7.66/7.75
7	33	199	326	286	7.48/7.59
8					7.45/7.45
9	28	207	328	284	7.35/7.80
11	28	134			7.74/7.61
13	48	233	552	440	7.73/7.71
15	64	249	544	456	7.84/7.78
17	52	224	456	404	7.74/7.77
19	48	172	420	416	7.7/7.61
21	44	199	424	384	7.81/7.50
23	40	199	432	380	7.98/7.77
25	42	210	488	432	7.83/7.32
27	46				7.61/7.19
29	46	167	464	428	
31	32	264	484	480	7.4/7.8

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EPA-287 (Cin.)
(4-78)

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TABLE A-9. (Continued)

Date	C.O.D.		Solids		
	Before (Total)	After (Soluble)	Before	After	pH
Nov. 1977					
2	36	240	472	408	7.3/7.5
4	32	208	436	360	7.3/7.1
6	38	264			7.5/7.0
8		396	412	376	7.5/7.2
10	20	240	492	352	7.9/7.2
12	40	200	468	432	7.7/7.1
14	28	157	516	460	7.4/6.8
16	42	205	472	380	7.2/6.6
18	40	205	576	440	7.4/7.1
		181			7.5/7.1
22	52	173			7.6/7.0
24	44	193			7.5/7.2
26	36	118	556	472	7.6/7.3
28	40	158			8.3/7.2
30	43	178	468	432	7.3/7.2
Dec 2	43	170	496	456	7.2/7.1
4	61	238	548	348	7.6/7.2
6	59	215	544	392	5.8/7.0
8	55	230	480	332	7.0/7.0
10	48	199	472	272	7.2/7.7
12	24	147	428	308	7.4/7.0
16	28	207	524	404	7.6/7.0
17	52	215	492	408	7.6/7.2
22	59	184	484	388	7.4/7.3
23	43	192	536	376	7.5/7.1
27	20	187	500	392	7.3/7.4
28	12	---	584	---	7.58

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TABLE A-10. SUBSTRATE REMOVAL DATA FOR HEXACHLOROBENZENE BATCH REACTOR

	Control		Hexachlorobenzene (50 mg/l)		Hexachlorobenzene (100 mg/l)	
Time Hr.	Soluble COD	Solids	Soluble COD	Solids	Soluble COD	Solids
0	253	92	253	88	265	104
2.17	198	156	214	140	214	140
4.25	198	140	194	156	194	156
5.45	174	168	162	176	174	176
7.25	147	192	134	200	153	184
9.25	99	212	95	--	119	212
11.25	51	216	99	216	59	224
13.0	51	228	75	212	63	212
24.0	45	212	71	168	67	236

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TABLE A-11. SUBSTRATE REMOVAL DATA FOR BENZENE BATCH REACTOR

	Control		Benzene 0.1 ml/liter		Benzene 0.2 ml/liter	
Time Hr.	Soluble COD	Solids	Soluble COD	Solids	Soluble COD	Solids
0	277	100	270	124	270	104
2.17	210	140	214	140	222	136
4.25	210	152	190	156	194	148
6.45	194	172	178	164	214	176
7.25	194	196	147	184	135	164
9.25	154	212	91	220	48	228
11.25	51	244	48	216	59	232
13.0	55	248	75	228	71	188
24.0	75	--	48	--	48	216

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PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-12. HEXACHLOROBENZENE AND BENZENE BATCH STRIPPING DATA

Time	Benzene 250 mg/1 COD	Hexachlorobenzene 500 mg/1 COD
0	181	26
5 min.	66	22
10 min.	30	
15 min.	10	
30 min.	14	22
1 Hr.	4	
6.5 Hr.	-	18
13 Hr.	14	26
24 Hr.	22	

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PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-13. CONTROL DATA FOR BATCH PHENOL AND PENTACHLOROPHENOL STUDIES

Date	C.O.D. Before (Total)	C.O.D. After (Soluble)	Solids Before	Solids After	pH
Aug. 1977					
19	70		80		
28	51		212		
31	67		432		
Sept.					
3		285		488	
4	65		496		
7		248	468	340	
9	46	236	464	344	7.5
11	44	238	432	300	
			444	336	
13	48	230	484	348	7.3
14	52	224	504	372	7.74
15			452	312	
16	36	221	472	340	7.66
17			504	376	
19	40	237	448	348	7.55/7.2
20			496	348	
22	36	233	468	336	7.45
24	44				
25	46	193	428	344	
27	44	213	416	344	
29	35	232	452	316	7.53
Oct.					
1	44	244	404	296	
4	20	260	480	320	7.45
6	24		440	332	
8	41	244	400	300	
10	41	224	424	316	
12	48	233	440	336	7.65/7.24
14	52	254	444	368	7.50/7.26
16	52	266	520	372	
18	48	252	548	396	
20	52	232	512	432	
23	41	370	476	392	7.72/7.30
25	53	248	452	356	
27	46		692	404	7.69/7.09
30	54	235	432	324	

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PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE 13-A. (continued)

Date	C.O.D.		Solids		
	Before (Total)	After (Soluble)	Before	After	pH
Nov. 1977					
1	44	218	436	372	
3	36				
4	40	244	404	324	
7	52				
9	44		444	340	
11	36	224			7.6/7.1
13	38				
15	60	217	476	384	7.2/6.7
17	48	233	480	376	
18	52				
21	40	217	448	348	8.0/7.3
23	48	273	440	360	
26	43	233	412	320	7.2/7.2
28	40	217	440	396	
30	40	233	468	348	
Dec. 1977					
2	55				7.5/7.6
4	35	223	500	360	
6	44	199	492	376	
8	35				
10	40				
12	32	248	428	308	
16		240			
17	167	448	412	344	
18	98				
20		255			
21	39	239	436	328	
22	47				
26		199		348	
27	32		428		

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EPA-287 (Cin.)
(4-76)

TABLE A-14. DATA FOR PHENOL BATCH REACTOR

Date	C.O.D.		Solids		
	Before (Total)	After (Soluble)	Before	After	pH
Aug. 1977					
19	54		47		
28	34		220		
31	47		308		
Sept. 1977					
3		267		380	
4	50		404		
7		246	428	312	
9	48	250	356	268	7.7
11	44	250	400	280	
12			408	288	
13	40	238			7.8
14	48	242	404	288	7.74
15			300	264	
16	48	229	388	276	7.34
17			432	308	
19	36	273	372	336	7.54/7.2
20			436	328	
22	36	253	424	324	7.53
24	44				
25	54	199	376	300	
27	44	221	416	340	
29	36	228	364	276	7.5
Oct. 1977					
1	50	228	376	272	
4	36	212	428	336	7.54
6	44	264	424	308	
8	53	264	320	276	
10	45	248	392	276	
12	58	270	432	304	7.75/7.28
14	48	274	388	356	7.46/7.35
16	52	286	492	304	
18	48	276	412	336	
20	48	260	448	312	
23	41	258	376	332	7.79/7.35
25	41	260	496	324	
27	66	303	396	312	7.62/7.09
30	50	295	372	316	

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PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-14 (continued)

Date	C.O.D.		Solids		pH
	Before (Total)	After (Soluble)	Before	After	
Nov. 1977					
1	52	242	428	320	
3	40	--		--	
4	36	260	352	276	
7	76	--			
9	64		388	240	
11	52	236	376	280	7.6/7.3
15	74	310	340	264	7.2/6.8
17	72	318			
18	50				
21	52	309	432	320	7.9/7.3
23	48	353	436	316	
26	55	304	480	364	7.3/7.3
28	51	308	436	364	
30	47	308	448	316	
Dec. 1977					
2	40				7.6/7.4
4	43	307	456	320	
6	43	293	504	348	
8	47				
10	40				
12	48	324	436	328	
16		288			
17	28	369	452	372	
18	90				
20		294			
21	47	255	428	316	
22	39				
26		262		196	
27	64		276		

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PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-15. DATA FOR PENTACHLOROPHENOL BATCH REACTOR

Date	C.O.D.		Solids		
	Before (Total)	After (Soluble)	Before	After	pH
Sept. 1977					
3		291		408	
4	42		552		
7			484	384	
9	48	252	304	228	7.7
11	40	242			
13	42	232	460	244	7.7
14	36	238	440	360	7.75
15			332	264	
16	52	233	388	332	7.45/7.74
17			432	364	
19	36	237	384	324	7.56/7.2
20			456	332	
22	32	221	424	328	7.82
24	52				
25	48		380	280	
27	56	237	284	220	
29	44	240	300	224	7.83
Oct. 1977					
1	52	224	280	208	
4	64	272	280	240	7.45
6	68	268	264	200	
8	69	280	244	228	
10	73	276	228	176	
12	85	278	244	152	7.67/7.95
14	89	289	216	216	7.62/7.93
16	89	278	252	196	
18	72	272	320	228	
20	68	256	324	268	
23	65	258	308	236	7.73/7.81
25	49	366	296	268	
27	74	295	320	260	
30	70	303	324	208	

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EPA-287 (Cin.)
(4-76)

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TABLE A-15. (continued)

Date	C.O.D. Before (Total)	C.O.D. After (Soluble)	Solids Before	Solids After	pH
Nov. 1977					
1	64	262	264	216	
3	52				
4	56	260	280	180	
7	84				
9	68	393	216	188	
11	68	377	324	208	7.78
13	60				
15	91	282	276	192	7.0/7.4
17	74	302	264	216	
18	109				
21	56	277	360	268	7.9/7.4
23	56	325	340	244	
26	63	277	372	280	7.2/7.4
28	59	265	388	284	
30	95	277	344	252	
Dec. 1977					
2	107				7.5/7.3
4	68	262	312	224	
6	55	262	328	236	
8	59				
10	60				
12	68	300	236	164	
16		284			
17	75	329	228	192	
18	114				
20		267			
21	71	271	368	260	
22	67				
26		274		304	
27	44		404		

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3/8"

PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-16. SUBSTRATE REMOVAL RATE DATA FOR PHENOL BATCH REACTOR

	Control		Phenol (25 mg/l)		Phenol (50 mg/l)	
Time Hr.	Soluble COD	Solids	Soluble COD	Solids	Soluble COD	Solids
0	246	144	310	136	387	148
1.5	198	168	242	180	327	160
4.5	125	212	151	252	230	224
7.5	66	256	68	280	--	264
10.5	109	240	93	280	105	276
13.5	142	222	105	275	76	290
19	161	248	36	292	40	304
24	143	270	30	298	40	310

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TABLE A-17. SUBSTRATE REMOVAL RATE DATA FOR PENTACHLOROPHENOL BATCH REACTOR

	Control		Pentachlorophenol (25 mg/l)		Pentachlorophenol (50 mg/l)	
Time Hr.	Soluble COD	Solids	Soluble COD	Solids	Soluble COD	Solids
0	252	96	272	112	286	148
1.5	246	84	268	96	--	100
4.5	415	108	264	116	315	120
7.5	327	108	379	104	278	108
10.5	157	124	218	112	266	88
15.5	65	152	110	143	137	105
21	48	188	69	188	89	176

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PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-18. PHENOL AND PENTACHLOROPHENOL BATCH STRIPPING DATA

Time Hour	Phenol COD mg/l.			Pentachlorophenol COD mg/l.		
	250	500	1000	250	500	1000
Test 1						
0	252	504	>1000	130	238	437
6	252	508	>1000	122	234	461
12	263	511	>1000	155	220	418
18	248	500	>1000	112	220	408
21	259	508	>1000	130	241	422
Test 2						
0	252	500	1472	176	284	288
6	252	496	1480	204	216	459
12	256	504	1500	164	236	501
21	244	496	1464	160	240	432

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PAGE NUMBER

EPA-287 (Cin.)
(4-76)

TABLE A-19. CONTROL DATA FOR BATCH 2-CHLOROPHENOL AND NITROBENZENE

Date	C.O.D. Before (Total)	C.O.D. After (Soluble)	Solids Before	Solids After	pH B/A
Jan. 1978					
10	46	169	636	448	7.7/7.3
11	45	177	524	496	7.7/7.2
13	35	161	528	448	7.7/7.7
15	39	165	496	444	7.9/7.3
17	35	586	492	424	7.3/7.6
19		369	468	328	7.7/7.6
21	48	264	548	380	7.5/7.6
23		550			
25	100	276	408	356	7.5/7.6
27	65	248	384	288	7.8/7.6
29	35	241	508	364	7.8/7.6
31	35	264	440	252	7.8/7.6
Feb. 1978					
2	28	520	384	348	8.0/7.4
4	75	252	528	308	7.8/7.5
6	47	248			7.4/7.4
8	59	224			7.6/7.3
10	32	230	516	230	7.6/7.3
12	39	278	536	380	7.7/7.4
14	35	254	432	272	8.0/7.4
16	96	250	456	332	8.0/7.5
18	43	258	552	440	7.75/7.33
20	42	289	512	324	7.8/7.2
22	60	314	588	488	7.4/7.2
24	81	266	688	496	7.4/7.2
26	52	262	488	396	7.8/7.4
28	40	230	500	404	7.9/7.3

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PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-19 (continued)

Date	C.O.D.		Solids		pH
	Before (Total)	After (Soluble)	Before	After	
March 1978					
2	48	266	520	380	7.6/7.5
4	44	241	552	380	7.7/7.4
6	48	213	512	420	7.6/7.4
8	28	162			7.2/7.1
10	39	181	392	331	7.9/7.3
12	39	209	516	452	8.0/7.3
14	45	217	532	408	8.2/7.2
18	44	286	512	340	8.0/7.5
20	52	248	388	272	8.1/7.4
22	44	212			7.7/7.2
25	67				7.9
28	35	239			7.1/7.1
29	35	195	420	312	7.9/7.4
30	24	185	712	496	
April 1978					
1	52	117			7.2
3	44	157			8.0
5	60	198			7.6/7.1
7	36	162	668	516	7.8/7.2
9	40	194			8.1/7.2
11	28	255	636	416	8.9/7.3
13	57	190	488	404	8.0/7.2
15	36	196			7.9/7.2
17	28	144	352	308	8.1/7.2
19	40	176			7.9/7.2
21	40	176	728	540	8.0/7.2
23	40	140	608	584	8.0/7.3
25	44	228	508	408	8.0/7.2
27	26	195	552	500	8.0/7.2
29	50	171	552	512	7.9/7.2

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PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-19 (continued)

Date	C.O.D.		Solids		pH
	Before (Total)	After (Soluble)	Before	After	
May 1978					
1	54	219	432	396	7.4/7.3
2	45	254	488	460	7.5/7.4
3	62		460	344	
4	40	268	408	348	
5	69	319	504	364	8.1/7.1
6	61	290	336	256	8.3/8.1
7	69	302	304	200	
8	56	253	260	184	8.2/7.9
9	92	257	308	228	
10	48	285	368	256	7.8/7.5
11	64	260	656	344	7.8
12	80				7.7
16	39	318	512	436	7.9/7.3
17	55	309	596	468	7.9
18	56	262	548	404	
19	91	310	576	400	7.8/7.2
20	51	245	692	412	7.9/7.2
21	47	237	796	376	7.7/7.0
22	43	245	560	388	7.6/7.3
23	51	308	508	460	7.9/7.2
24	73	224	656	456	7.7/7/2
25	45	260	616	408	7.9/7.8
26	45	412	468	412	8.0/7.2
27	36	232	500	376	7.9/7.3
28	32	232	468	360	8.0/7.4
29	28	246	488	368	7.8/7.2
30	32	226	464	392	8.0/7.7
31	46	210	460	368	8.1/7.3

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EPA-287 (Cin.)
(4-76)

TABLE A-19 (continued)

Date	C.O.D.		Solids		pH
	Before (Total)	After (Soluble)	Before	After	
June 1978					
1	34	198	500	392	7.9/7.2
2	34	237	512	344	7.8/7.2
3	42	317	480	376	7.7/7.0
4	44	233	556	440	7.7/7.7
5	36	230	612	460	7.8/7.2
6	36	250	624	396	7.7/7.3
7	56	241	644	356	7.8/7.3
8	29	241	616	368	7.9/7.3
9	25	221	556	308	7.9/7.7
10	20	269	508	336	7.8/7.3
11	40	253	336	296	7.9/7.4
12	32	261	460	340	7.9/7.4
13	36	273	456	328	7.9/7.4
14	39	250	504	296	7.9/7.8
15	39	246	472	284	8.0/7.6
16	30		516		7.9

PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-20. DATA FOR 2-CHLOROPHENOL BATCH REACTORS

Date	C.O.D. Before (Total)	C.O.D. After (Soluble)	Solids Before	Solids After	pH
Jan. 1978					
10	46	151	520	436	7.7/7.2
11	43	164	500	488	7.7/7.2
13	39	236	504	432	7.8/7.1
15	39	161	504	440	8.1/7.4
17	51	579	452	364	7.6/7.7
19		346	376	292	7.9/7.8
21	52	276	544	352	7.7/7.9
23		584		312	
25	100	272	360	280	8.6/7.9
27	56	260	376	300	8.8/7.9
29	51	224	492	316	8.9/7.9
31	59	276	280	224	8.9/8.0
Feb. 1978					
2	39	548	288	252	8.8/7.7
4	103	264	432	292	8.4/7.7
6	51	252			8.5/7.7
8	51	253			8.5/7.6
10	32	206	412	206	8.2/7.5
12	43	262	320	264	8.6/7.6
14	30	266	380	192	8.3/7.6
16	55	266	332	300	8.4/7.6
18	43	242	496	324	8.32/7.48
20	131	317	488	300	8.5/7.3
22	145	350	456	352	8.2/7.5
24	109	294	448	256	8.3/7.4
26	56	286	424	416	8.4/7.9
28	40	286	400	324	8.5/7.6

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PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-20 (continued)

Date	C.O.D.		Solids		
	Before (Total)	After (Soluble)	Before	After	pH
Mar. 1978					
2	137	310	492	308	8.7/7.6
4	44	290	520	348	8.5/7.7
6	44	270	484	356	8.4/7.7
8	45	259	512	259	8.3/7.3
10	47	209	348	352	8.4/7.3
12	51	268	548	440	8.5/7.6
14	71	260	504	368	8.6/7.4
18	64	308	528	404	8.4/7.5
20	76	256	400	380	8.5/7.4
22	88	268	448	416	8.5/7.4
25	79		596		8.3
26	175	259	536		8.4/7.3
29	35	251	480	292	8.4/7.6
31	40	226	532	492	
April 1978					
1	56	153			7.2
3		246	588	500	7.9/7.2
5	65	238			7.8/7.1
7	49	206			7.6/7.2
9	53	243			7.9/7.3
11	45	223			8.1/7.3
13	73	287	524	420	8.3/7.3
15	40	256			8.3/7.3
17	36	192	364	348	8.6/7.3
19	56	228			8.5/8.0
21	76	264			8.4/7.2
23	48	200			8.5/7.3
25	48	228			8.5/7.4
27	34	243	604	548	8.5/7.3
29	62	287			8.5/7.3

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3/8"
PAGE NUMBER

EPA-287 (Cin.)
(4-76)

TABLE A-20 (Continued)

Date	C.O.D.		Solids		
	Before (Total)	After (Soluble)	Before	After	pH
May 1978					
1	38	215			8.5/7.3
2	25	209			8.4/7.3
3	37	217			
4	52	256	540	480	
5	44	302	640	548	8.5/7.3
6	44	290	548	460	8.5/7.6
7	44	290	572	436	
8	48	273	460	404	8.4/7.4
9	36	245	500	492	
10	36	185			8.5/7.1
11	56	232	880	572	8.6
12	56		500		8.8
16	51	309	556	484	8.6/7.3
17	43	301	708	484	8.4
18	48		508	432	
19	81	282	548	484	8.3
20	51	230	564	468	8.3/7.2
21	51	198	596	432	8.1/7.1
22	54	213	516	408	8.1
23	51	285			8.3
24	73	207	636	484	8.2
25	45	264	544	444	7.8
26	45				8.3
27	32	188	472	460	8.3
28	28	228	464	392	8.3
29	40	196	508	432	8.2
30	34	190	520	460	8.3
31	38	226	484	428	8.3

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3/8"

PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-20 (Continued

Date	C.O.D.		Solids		
	Before (Total)	After (Soluble)	Before	After	pH
June 1978					
1	38	206	540	424	8.0
2	34	230	520	400	8.2
3	38	321	540	392	7.8
4	48	237	612	420	8.2
5	28	190	632	484	8.3
6	40	177	564	496	8.2
7	44	217	572	376	8.2
8	57	209	564	380	8.2
9	37	209	512	336	8.2
10	19	229	492	352	8.1
11	28	253	328	328	8.2
12	44	229	420	384	8.3
13	48	241	524	400	8.1
14	47	246	664	392	8.6
15	35	226	536	392	8.5
16	45	---	584	---	8.6

EPA-287 (Cin.)
(4-76)

TABLE A-21. CONTROL DATA FOR NITROBENZENE BATCH REACTORS

Date	C.O.D. Before (Total)	C.O.D. After (Soluble)	Solids Before	Solids After	pH
Jan. 1978					
10	38	167	524	424	7.7/7.3
11	47	134	516	392	7.7/7.2
13	28	142	496	412	7.7/7.7
15	35	165	528	412	8.0/7.4
17	39	559	444	372	7.5/7.7
19		354	616	328	7.7/7.7
21	44	264	516	380	7.6/7.8
25	90	246	416	304	7.8/7.7
27	71	252	412	328	8.5/7.7
29	39	245	512	336	8.7/7.8
31	43	256	440	252	8.7/7.8
Feb. 1978					
2	24	497	320	276	8.6/7.6
4	96	256	420	316	8.2/7.6
6	55	233			8.3/7.5
8	51	244			8.2/7.5
10	36	262	468	262	7.9/7.4
12	59	259	364	296	8.2/7.4
14	35	266	360	252	8.0/7.4
16	63	250	356	316	8.1/7.5
18	47	262	500	372	7.92/7.40
20	51	293	476	308	8.2/7.1
22	64	326	500	472	8.1/7.4
24	56	286	560	412	8.3/7.4
26	52	278	568	336	8.4/7.6
28	60	262	456	344	8.5/7.5

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PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-21 (continued)

Date	C.O.D.		Solids		
	Before (Total)	After (Soluble)	Before	After	pH
March 1978					
2		298	500	340	8.6/7.6
4	52	286	528	332	8.6/7.7
6	48	278	468	420	8.5/7.8
8	40	279	452	279	7.5/7.4
10	43	272			8.5/7.3
12	47	260	644	396	8.6/7.7
14	43	240	460	368	8.6/7.5
18	44	268	396	340	8.5/7.6
20	44	264	336	276	8.5/7.5
22	96	304			8.5/7.4
25	87				8.4
26	37	231			8.2/7.3
29	39	207	420	316	8.5/7.5
31	32	222	580	472	
April 1978					
1	52				7.3
3	48	226	480	480	8.5/7.0
5	--	218	696	218	8.3/7.2
7	61	227	580	500	8.0/7.3
9	97	356	420	352	8.0/7.3
11	32	251	432	384	8.0/7.3
13	32	243	524	396	8.4/7.3
15	40	248			8.4/7.3
17	32	164			8.5/7.3
19	44	188			8.5/7.5
21	48	236			8.5/7.3
23	56	176			8.6/7.4
25	44	224			8.6/7.3
27	42	215	540	432	8.6/7.4
29	74	167			8.5/7.3

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PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-21 (Continued)

Date	C.O.D.		Solids		
	Before (Total)	After (Soluble)	Before	After	pH
May 1978					
1	38	191			8.4/7.3
2	33	209			8.4/7.3
3	37	246			
4	32	248	520	464	
5	48	278	616	516	8.4/7.2
6	40	274	492	468	8.5/7.6
7	52	278	556	420	
8	56	281	460	452	8.5/7.5
9	40	225			
10	36	185			8.5/7.2
11	60	272	740	512	8.5/8.5
12	52				
16	43	281	568	508	8.1/7.3
17	35	285	664	536	7.9
18	40		512	460	
19	43	408	600	464	7.7
20	51	237	536	452	7.9/7.1
21	51	233	524	400	7.6/6.9
22	47	209	444	440	7.7
23	47	277			7.9
24	69	207	644	468	7.8
25	41	260	612	432	7.9
26	41	452	516	452	8.0
27	36	182	480	436	7.9
28	28	224	480	384	8.0
29	28	200	468	436	7.9
30	30	206	508	436	8.1
31	34	218			8.1

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PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-21 (Continued)

Date	C.O.D. Before (Total)	C.O.D. After (Soluble)	Solids Before	Solids After	pH
June 1978					
1	34	174	544	440	8.0
2	34	233	572	352	7.8
3	56	309	528	396	7.7
4	60	233	604	448	7.7
5	28	173	596	508	7.8
6	32	254	592	416	7.7
7	56	257	576	404	7.8
8	29	205	756	380	8.0
9	57	205			7.9
10	13	245	524	360	8.0
11	36	245	400	332	7.9
12	36	241	412	380	8.0
13	48	237			8.0
14	35	246	708	344	8.1
15	35	254	516	364	8.0
16	39				8.2

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PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-22. SUBSTRATE REMOVAL RATE DATA-2-CHLOROPHENOL & NITROBENZENE REACTOR

	Control		Nitrobenzene		2-Chlorophenol	
Time Hr.	Soluble COD	Solids	Soluble COD	Solids	Soluble COD	Solids
Toxic Dosage = 5 mg/l						
0	269	344	265	344	251	384
1	205	368	201	352	193	344
3	131	404	125	408	125	384
5.5	58	432	70	444	56	424
8.5	62	528	70	568	54	416
12.5	50	456	58	416	46	416
16.5	54	432	58	424	54	236
20	58	380	54	328	54	340
24	42	444	54	404	58	400
Toxic Dosage = 25 mg/l						
0	289	324	293	308	317	300
1	123	464	143	436	168	392
3.75	71	576	83	536	79	448
5.25	103	536	103	504	95	460
7.25	59	536	67	488	85	440
9.75	38	512	51	480	63	416
12.75	60	484	60	460	71	412
17.25	71	516	60	472	87	416
20.25	48	532	60	492	67	424
24	60	512	52	476	79	396
Toxic Dosage = 50 mg/l						
0	185	496	222	472	226	492
1	81	536	93	564	113	576
2	65	560	89	560	97	540
3	89	556	85	608	113	572
5	56	548	81	580	93	524
8	85	484	81	488	93	476
15	73	504	73	516	85	568
20	60	532	69	524	81	496
24	52	520	52	520	56	496

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3/8"

PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-23. 2-CHLOROPHENOL AND NITROBENZENE BATCH STRIPPING DATA

Theoretical COD	NITROBENZENE			2-CHLOROPHENOL		
	250	500	1000	250	500	1000
	250 mg/l.	500 mg/l.	1000 mg/l.	250 mg/l.	500 mg/l.	1000 mg/l.
Time	COD	COD	COD	COD	COD	COD
Test 1						
0	183	334	593	266	453	960
10 min.	163	270	561	266	457	960
20 min.	199	298	577	266	461	960
30 min.	187	402	775	260	464	957
1 hour	224	401	725	250	460	957
3 hour	159	226	497	246	512	968
6 hour	143	266	465	234	444	872
12 hour	76	165	301	226	429	857
18 hour	139	131	285	254	413	873
21 hour	63	131	223	214	401	731
Test 2						
0	150	338	664	290	538	931
30 min.	202	314	627	---	---	---
1 hour	170	286	624	278	526	925
6 hour	146	226	440	270	506	877
14.5 hour	102	150	328	242	458	776
18.5 hour	62	118	205	234	434	739
21 hour	78	106	184	442	442	717

Air Flow Rate = 4 CHF, Volume of Reactor - 3 litres

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PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-24. OXYGEN UPTAKE DATA FOR 2-CHLOROBENZENE AND NITROBENZENE REACTORS

Time Hr.	Control mg/l O_2	Nitrobenzene mg/l O_2	2-Chlorophenol mg/l O_2
Toxic Concentration = 10 mg/l			
0	0	0	0
1.0	9	9	8
2.0	17	17	16
3.3	24	28	24
5.0	37	41	35
7.5	45	48	41
9.5	51	53	44
12.0	62	63	52
15.0	73	71	59
16.5	79	76	63
19.0	86	83	68
24.0	93	95	82
Toxic Concentration = 50 mg/l			
0	0	0	0
1	19	18	19
2	38	36	36
4.25	48	44	45
5.25	55	49	51
6.25	61	55	55
7.25	66	59	59
9.25	76	69	66
10.25	80	72	68
11.25	84	76	71
12.25	88	79	74
13.25	91	81	76
17.00	102	92	85
18.00	105	95	88
19.00	110	96	90
20.00	113	98	92
21.50	117	102	95
23.25	121	106	99
24.00	121	109	101

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TABLE A-24 (Continued)

Time Hr.	Control mg/l O_2	Nitrobenzene mg/l O_2	2-Chlorophenol Mg/l O_2
Toxic Concentration = 100 mg/l			
0	0	0	0
1	7	4	8
2	16	11	16
3	23	14	19
5	39	25	32
7	49	32	40
9	59	38	46
15	78	52	62
20	85	62	73
22	88	66	76
25.5	92	69	81

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3/8"

PAGE NUMBER

EPA-287 (Cin.)
(4-76)

TABLE A-25. CONTROL DATA FOR BATCH ANTHRACENE AND 2-NITROPHENOL STUDIES

Date	C.O.D. Before (Total)	C.O.D. After (Soluble)	Solids Before	Solids After	pH
Jan. 1978					
10	50	201	500	352	7.62/7.22
11	39	181	496	400	7.44/7.27
13	31	256	532	416	7.57/7.16
15	43	154	456	448	8.0/7.37
17	26	543	632	524	7.56/7.53
19		358	592	204	7.77/7.73
21	60	264	600	416	7.70/7.86
23	58	560	444	328	
25	104	272	496	388	7.5/7.7
27	56	260	420	380	7.62/7.7
29	43	276	756	396	7.7/7.66
31	51	241	516	268	7.67/7.71
Feb. 1978					
2	39	473	432	280	
4	91	256	588	320	8.05/7.63
6	51	280	612	400	8.0/7.51
8	75	244			7.63/7.32
10	32	238	552	452	7.5/7.28
12	47	246	500	368	7.76/7.36
14	30	274	332	324	7.88/7.44
16	47	246	444	304	7.93/7.49
18	39	254	548	480	7.68/7.72
20	55	269	520	324	
22	64	318	656	528	7.2/7.23
24	73	254	648	516	7.25/7.28
26	44	254	460	360	7.75/7.39
28	24	238	520	404	7.85/7.36

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PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-25. (Continued)

Date	C.O.D.		Solids		
	Before (Total)	After (Soluble)	Before	After	pH
March 1978					
2	48	266	520	380	7.75/7.47
4	73	266	632	448	7.38/7.40
6	52	238	464	388	7.44/7.45
8	61	231	604	560	7.22/7.17
10	51	244	516	504	7.34/7.35
12	51	228	520	436	8.0/7.41
14	43	205	552	444	8.06/7.22
16	43	213	556	392	7.89/7.53
18	52	256	540	364	7.99/7.47
20	76	244	392	344	8.04/7.37
22					7.50/7.35
24					7.82/7.48
25					7.80
26	63	231	396	324	7.53/7.43
29	39	203			6.97/7.28
31	36	258	664	336	
April 1978					
1	56	169	488	460	7.1
3	65				8.0/7.2
5	69	254	444	340	7.6/7.0
7	65	275	484	440	7.5/7.3
9		279	508	340	7.9/7.2
11	40	194			7.7/7.2
13	28	275	452	400	7.9/7.2
15	52	176			7.7/7.2
17	44				8.0/7.2
19	40	176			7.8/7.1
21	60	220			7.6/7.4
23	48	176	548	440	8.0/7.4
25	32	200	492	456	8.0/7.3
27	30	251	576	564	7.8/7.2
29	40	220	548	544	7.8/7.2

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3/8"
PAGE NUMBER
EPA-287 (Cin.)
(4-76)

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TABLE A-25 (Continued)

Date	C.O.D.		Solids		
	Before (Total)	After (Soluble)	Before	After	pH
May 1978					
1	46	167			7.4/7.3
2	45	213			7.5/7.2
3	37	230	440	428	
4	28	220	488	452	
5	36	266	636	432	7.8/7.1
6	44	250	528	408	8.0/7.6
7	61	230	552	376	
8	36	245	448	356	7.9/7.4
9	56	213	480	408	
10	40	193	492	408	7.9/7.4
12	36	---	---	---	7.7
16	76	322	600	332	7.5/7.5
17	76	342	472	336	7.5
18	76		344	240	
19	75	412	356	244	7.6/7.7
20	89	270	400	276	7.7
21	59	253	396	228	7.4/7.3
22	71	312	464	268	7.2/7.4
23	59	356	404	340	7.4/7.1
24	85	240	568	388	7.6/7.3
25	53	264	596	336	7.7/7.4
26	60	262	476	328	7.8/7.4
27	36	252	500	332	7.8/7.3
28	56	240	424	300	7.8/7.4
29	40	268	396	320	7.8/7.2
30	40	242	476	376	8.0
31	38	218	508	436	8.0/7.3

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TABLE A-25. (Continued)

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Date	C.O.D.		Solids		
	Before (Total)	After (Soluble)	Before	After	pH
June 1978					
1	38	250	608	388	7.9/7.2
2	38	221	536	324	7.8/7.2
3	36	297	452	364	7.7/7.1
4	36	249	556	368	7.6/7.1
5	48	222	612	400	7.7/7.2
6	40	242	528	372	7.7/7.3
7	44	225	540	348	7.7/7.3
8	33	221	636	328	7.8/7.3
9	33	221	468	312	7.8/7.6
10	21	233	444	312	7.7/7.2
11	40	233	320	268	7.8/7.3
12	36	265	468	316	7.9/7.2
13	52	253	456	304	7.8/7.3
14	39	234	420	288	8.2/7.7
15	39	250	460	340	8.2/7.2
16	35	---	636		

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PAGE NUMBER

EPA-287 (Cin.)
(4-76)

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TABLE A-26. DATA FOR ANTHRACENE BATCH REACTOR

Date	C.O.D. Before (Total)	C.O.D. After (Soluble)	Solids Before	Solids After	pH
Jan. 1978					
10	46	223	684	404	7.46/7.26
11	47	185	524	472	7.53/7.29
13	30	181	560	392	7.49/7.17
15	39	173	520	448	7.95/7.42
17	26	571	548	492	7.61/7.51
19		369	412	260	7.79/7.71
21	68	274	556	428	7.74/7.91
23	58	546	448	360	
25	112	280	480	296	7.7/7.7
27	50	264	528	392	7.75/7.61
29	35	252	428	400	7.75/7.64
31	43	252	688	316	7.87/7.7
Feb. 1978					
2	35	505	464	364	
4	122	248	608	356	7.67/7.49
6	138	327	596	376	7.72/7.38
8	46	180	660	432	7.61/7.33
10	32	226	524	516	7.5/7.34
12	63	327	412	380	7.7/7.34
14	26	348	484	360	7.85/7.44
16	43	258	436	336	7.97/7.56
18	39	238	628	496	8.09/7.36
20	59	261			
22	52	278	580	520	7.21/7.21
24	56	250	600	480	7.27/7.31
26	44	258	476	412	7.81/7.40
28	40	250	552	364	7.86/7.36

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3/8"
PAGE NUMBER

TABLE A-26. (Continued)

Date	C.O.D.		Solids		pH
	Before (Total)	After (Soluble)	Before	After	
Mar. 1978					
2	40	262	488	380	7.86/7.43
4		250	664	464	7.44/7.40
6		218	656	452	7.60/7.35
8	53	201	732	580	7.40/7.15
10	75	224			7.67/7.30
12	51	217			7.98/7.31
14	43	173	564	488	8.13/7.13
16	35	217	660	428	7.80/7.67
18	40	264	556	516	7.87/7.42
20	40	228	456	356	8.15/7.24
22	44	208	524	468	7.62/7.15
24		247			7.97/7.39
25	95				7.83
26	43	239	492	304	7.93/7.33
29	47	175			6.90/7.12
31	36	230	748	452	
April 1978					
1	48	117			7.2
3		165			8.0/7.0
5	56	173	616	596	7.8/7.2
7	53	251	540	440	7.6/7.2
9	73	227	476	400	8.0/7.1
11	45	206	508	432	7.8/7.2
13	36	227	476	436	7.9/7.2
15	40	200			7.7/7.2
17	28	136			8.0/7.2
19	48	196			7.9/7.2
21	56	220	668	520	7.9/7.4
23	44	---			8.0/7.4
25	44	212	556	484	8.0/7.3
27	58	171	708	616	7.8/7.3
29	38	155			8.0/7.2

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PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-26. (Continued)

Date	C.O.D.		Solids		
	Before (Total)	After (Soluble)	Before	After	pH
May 1978					
1	46	243			7/6/7.3
2	--	205	604	580	7.6/7.3
3	33	234	496	464	
4	28	218	484	460	
5	48	323	748	592	7.9/7.2
6	40	250	608	464	8.2/7.5
7	56	242	608	444	
8	36	265	584	432	8.1/7.4
9	40	201	556	500	
10	36	189	580	516	7.5/7.5
12	44	--		--	7.9
16	35	305	568	480	7.5/7.4
17	55	322	620	460	7.7
18	88		480	360	
19	83	333	428	328	7.4
20	112	274	464	256	7.5
21	83	285	460	256	7.4
22	67	306	450	216	7.6
23	75	352			7.7
24	102	293	640	424	7.6
25	57	289	352	344	7.8
26	60	270	400	324	7.8
27	44	260	460	304	7.9
28	60	252	388	312	7.9
29	32	272	400	328	7.8
31	38	226	580	380	8.0

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3/8"

PAGE NUMBER
EPA-287 (Cin.)
(4-76)

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TABLE A-26. (Continued

Date	C.O.D.		Solids		
	Before (Total)	After (Soluble)	Before	After	pH
June 1978					
1	38	214	608	372	7.9
2	38	241	552	332	7.7
3	32	305	456	368	7.8
4	36	269	608	376	7.7
5	36	246	560	416	7.7
6	40	238	516	416	7.6
7	40	245	576	348	7.8
8	21	229	668	364	7.9
9	33	221	628	356	8.0
10	21	245	508	344	7.8
11	40	245	352	312	7.9
12	36	257	520	372	8.0
13	40	245	520	348	7.7
14	35	246	684	512	8.1
15	22	258	668	376	8.2
16	39	--	612		

PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-27. DATA FOR 2-NITROPHENOL BATCH REACTOR

Data	C.O.D.		Solids		
	Before (Total)	After (Soluble)	Before	After	pH
Jan. 1978					
10	48	205	488	420	7.67/7.27
11	43	181	536	448	7.53/7.28
13	31	173	448	396	7.52/7.16
15	35	169	672	460	7.96/7.42
17	24	567	588	504	7.65/7.52
19		389	480	320	7.75/7.69
21	76	268	684	452	7.57/7.78
23	60	576	464	364	
25	124	270	460	368	8.1/7.7
27	65	256	488	396	8.12/7.74
29	71	252	696	376	8.27/7.69
31	47	245	644	312	8.06/7.66
Feb. 1978					
2	35	497	456	284	
4	87	260	568	300	7.75/7.39
6	47	237	568	392	7.77/7.31
8	79	285			7.54/7.23
10	36	214	676	604	7.48/7.28
12	55	246	668	504	7.67/7.32
14	30	254	604	404	7.87/7.40
16	39	262	592	380	7.99/7.54
18	39	262	684	556	8.65/7.34
20	71	285	392	352	
22	52	326			7.67/7.25
24	56	278			7.4/7.22
26	60	270			7.78/7.37
28	44	266	440	372	7.78/7.37

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3/8"
PAGE NUMBER
EPA-287 (Cin.)
(4-76)

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TABLE A-27. (Continued)

Date	C.O.D.		Solids		
	Before (Total)	After (Soluble)	Before	After	pH
March 1978					
2		290	540	392	7.75/7.36
4	48	286	452	428	7.56/7.41
6	64	258	704	452	7.62/7.38
8	49	296	588	512	7.48/7.17
10	51	220	416	408	7.81/7.38
12	43	248	604	492	8.03/7.40
14	39	224	496	420	8.17/7.23
16	35	236	504	392	7.80/7.58
18	52	268	620	420	8.13/7.44
20	44	264	400	364	8.26/7.38
22	56				7.61/7.30
24					8.10/7.50
25					8.02
26	35	275	592	320	8.05/7.40
29	31	299	556	528	7.0/7.20
31	40	262	688	416	
April 1978					
1	65	190			
3	44	258	560	428	7.9/7.2
5	65	274	504	484	7.8/7.1
7	45	348	632	368	7.6/7.2
9	32	255	508	308	7.9/7.3
11	32	259	536	388	8.1/7.3
13	--	283	528	424	8.2/7.3
15	46	252			8.0/7.3
17	36	154			7.9/7.3
19	76	164			7.8/7.2
21	76	252	784	536	7.9/7.4
23	36	236	688	504	7.9/7.5
25	52	244	604	444	7.9/7.4
27	26	251	624	504	7.8/7.3
29	40	255	540	508	7.8/7.4

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PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-27 (Continued)

Date	C.O.D.		Solids		pH
	Before (Total)	After (Soluble)	Before	After	
May 1978					
1	42	235	460	396	7.7/7.3
2	41	250	536	516	7.4/7.4
3	41	275			
4	28	216	448	444	
5	40	323	604	456	8.1/7.3
6	40	290			8.2/7.7
7	40	290	600	436	
8	36	297			8.1/7.5
9	28	265			
10	36	245			7.8/7.4
12	56	---		---	7.8
16	39	289	720	512	7.5/7.4
17	55	342	768	496	7.9
18	40		544	456	
19	43	318	592	424	7.7
20	63	254	708	392	7.8
21	47	278	604	340	7.6/7.0
22	43	237	600	392	7.5
23	47	285			7.6
24	77	215	632	480	7.6
25	53	285	552	396	7.8
26	60	254	448	380	7.8
27	36	240	412	372	7.9
28	56	256	412	368	7.9
29	28	236	412	384	7.8
31	38	218	592	448	8.1

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PAGE NUMBER
EPA-287 (Cin.)
(4-76)

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TABLE A- 27 (Continued)

Date	C.O.D.		Solids		
	Before (Total)	After (Soluble)	Before	After	pH
June 1978					
1	34	178	544	532	7.9
2	38	230	612	360	7.7
3	30	329	456	376	7.8
4	40	237	608	408	7.6
5	40	218	548	412	7.8
6	40	234	544	396	7.7
7	44	261	624	352	7.8
8	33	209	580	348	8.0
9	28	209	540	316	7.9
10	17	245	424	332	7.8
11	36	269	348	284	8.0
12	40	233	436	356	7.9
13	32	241	484	340	7.7
14	39	230			8.2
15	30	262	692	360	8.1
16	30		588		

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PAGE NUMBER

EPA-287 (Cin.)
(4-76)

TABLE A-28. SUBSTRATE REMOVAL RATE DATA FOR ANTHRACENE & 2-NITROPHENOL REACTOR

Time Hr.	Control		Anthracene		Nitrophenol	
	Soluble COD	Solids	Soluble COD	Solids	Soluble COD	Solids
Toxic Concentration = 5 mg/l						
0	285	360	293	372	269	376
1	219	400	213	420	185	420
3	129	304	151	432	113	468
5.5	66	456	54	456	54	468
8.5	54	460	58	400	58	432
12.5	62	448	62	428	62	456
16.5	46	468	60	448	58	476
20.0	52	400	62	388	66	408
24.0	58	444	58	448	60	464
Toxic Concentration = 25 mg/l						
0	269	324	261	380	285	352
1	192	404	99	540	139	516
3.45	59	568	59	564	95	680
5.15	51	524	46	544	59	552
7.15	119	484	46	544	63	564
9.45	55	496	26	540	55	508
12.45	63	484	71	512	68	512
17.15	56	688	52	524	44	528
20.15	67	500	52	532	67	560
24.00	60	496	71	520	60	516
Toxic Concentration = 50 mg/l						
0	258	336	230	452	262	416
1	85	512	81	572	137	536
2	56	524	65	552	113	504
3	65	512	56	584	149	508
5	65	548	56	580	97	524
8	85	476	85	472	129	452
15	69	468	69	524	109	476
20	65	488	60	548	81	500
24	56	488	48	512	65	492

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3/8"

PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-29. ANTHRACENE BATCH STRIPPING DATA

Theoretical COD	ANTHRACENE		
	250	500	1000
	250 mg/l	500 mg/l	1000 mg/l
Time	COD	COD	COD
Test 1			
0	184	324	1099
1	252	428	1061
4	260	492	971
6	228	360	944
8.5	210	426	1010
17.5	214	426	1032
20.5	202	486	983
24.0	210	438	1016
Test 2			
0	206	474	856
2	252	428	880
6	262	422	872
9	230	430	858
18	216	456	860
24	228	488	992

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3/8"

PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-30. 2-NITROPHENOL BATCH STRIPPING DATA

Theoretical COD	2-NITROPHENOL		
	250	500	1000
	250 mg/l	500 mg/l	1000 mg/l
Time	COD	COD	COD
Test 1			
0	248	500	944
	(pH=8.3)	(pH=8.0)	(pH=7.25)
1	252	480	933
2	256	528	917
5	268	428	891
7	256	488	896
9.5	246	462	845
18.5	234	458	733
	(pH=8.5)		
21.5	250	466	739
24.0	254	474	739
Test 2			
0	258	490	984
3	250	460	920
6	254	494	909
9	246	460	850
12	244	472	784
24	248	472	752

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3/8"

EPA-287 (Cin.)
(4-76)

TABLE A-31. CONTROL DATA FOR BATCH HEXACHLOROETHANE AND FLUORENE STUDIES

Date	C.O.D.		Solids		
	Before (Total)	After (Soluble)	Before	After	pH
January 1978					
10	51				7.63
13	45	236	488	400	
14	51				8.11
15	31	232	408	360	
17	63	583	420	364	
20	76				
22	44	256	404	312	7.89
24			444	308	7.97
27		256	448	300	7.97
29			336	256	
31			396	256	
February 1978					
2			400	336	7.76
5	55	260			
7	46	257	408	272	7.81
9	56	258	424	288	
12	43	234	356	280	7.82
14	39				
16	26		380	252	
18	26	232	524	328	8.75
20	42		432		9.09
22	44	321			8.00
26	36	226	472	312	8.06
28	48	218	364	268	

(continued)

TABLE A-31 (continued)

Date	C.O.D.		Solids		
	Before (Total)	After (Soluble)	Before	After	pH
March 1978					
2	36	233	440	348	
5	48	237	408	300	7.62
7	36	205	508	424	
9	43	228	496	368	
11	63				7.91
13	43	232	448	340	
16	35				8.10
17	24				
19	40	209	484	356	
21	28	257	476	292	8.10
23	35				
25	75	243	344	256	8.04
27	39	195	408	296	
30			476	424	
April 1978					
1			332	240	
4	65	262	252	172	
7	53				
9	57	389	268	168	
11	89	255	232	224	
13	60	240	320	260	
15	40	264	352	272	8.04
17	60	224	248	200	8.18
19	76	232	352	316	8.07
21	76	248	364	300	8.11
23	60	284	360	356	8.11
25	48	208	400	380	8.05
27	48	193	412	408	8.14
29	52	185	392	284	8.12

(continued)

TABLE A-31. (continued)

Date	C.O.D.		Solids		
	Before (Total)	After (Soluble)	Before	After	pH
May 1978					
1	62	183	288	312	8.16
2	45	372			
3	33	180			
4	32	192			
5	44	214	640	560	
6	36	222			
7	40	174	592	516	
8	40	177	464	316	
9	24	116			
10	36	137			
11	28	156	732	604	8.04
12	36	--			8.01
16	72	289	584	428	7.22
17	104	305	628	388	
18	64		412	280	
19	65	323	484	296	
20	38	256	456	348	7.60
21	55	318	516	304	7.05
22	67	274	460	324	7.37
23	47	253			7.81
24	73	252	704	404	7.59
25	49	240	540	396	7.74
26	48	226	464	404	7.3
27	40	220	464	360	7.83
28	48	196	496	340	7.81
29	32	180	440	400	7.92
30	38	174	480	424	8.06
31	34	226	476	384	8.04/7.15

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EPA-287 (Cin.)
(4-76)

TABLE A-31. (continued)

Date	C.O.D. Before (Total)	C.O.D. After (Soluble)	Solids Before	Solids After	pH
June 1978					
1	30	158	476	416	7.9/7.2
2	32	190	556	380	7.8/7.6
3	32	269	468	388	7.6/7.0
4	32	209	556	452	7.7/7.1
5	32	157	636	484	7.8/7.3
6	36	359	616	376	7.6/7.3
7	44	237	472	320	7.7/7.4
8	33	229	620	328	7.8/7.4
9	29	--	532	312	7.9/7.6
10	21	257	492	316	7.9/7.4
11	32	249	360	276	8.2/7.4
12	32	237	420	344	8.1/7.3
13	40	261	492	344	8.0/7.4
14	30	238	536	344	8.2/7.8
15	30	201	492	340	8.0/7.5
16	41	--		--	8.1

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PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-32. DATA FOR HEXACHLOROETHANE BATCH REACTORS

Date	C.O.D. Before (Total)	C.O.D. After (Soluble)	Solids Before	Solids After	pH
January 1978					
10	51				7.79
13	47	244	440	364	
14	43				8.17
15	24		404	284	
17	35	571	416	316	
20	104				
22	40	268	336	244	8.07
24		372	364	264	8.16
27	66	260	372	228	8.16
29			280	164	
31			304	268	
February 1978					
2					7.79
5	55	260			
7	46	257	340	284	7.26
9	48	262	392	316	
12	43	230			7.84
14	39				
16	26		388	244	
18	26	232	408	320	8.94
20	34				8.95
22	48	317			7.81
26	36	246	412	280	8.02
28	56	334	320	260	

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EPA-287 (Cin.)
(4-76)

TABLE A-32 (continued)

Date	C.O.D. Before (Total)	C.O.D. After (Soluble)	Solids Before	Solids After	pH
March 1978					
2	36	241	408	344	
5	44	237	446	336	7.60
7	40	217	428	364	
9	39	228	472	340	
11					7.59
13	47	240	396	316	
16	43				8.12
17	24				
19	40	225	432	344	
21	36	245	444	280	8.01
23	35				
25	67	247	328	224	7.87
27	47	227	340	196	
April 1978					
1			272	176	
4	85	290	332	208	
7	45				
9	45	263	236	108	
11	49	247	292	216	
13	56		352	308	
15	36	248			8.09
17	40	224	264	248	8.14
19		200			7.99
21		652	400	348	7.99
23	96	204	392	304	8.15
25	36	220	460	420	8.08
27	36	227	564	400	8.12
29	38	196	340	304	8.14

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3/8"

PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-32. (continued)

Date	C.O.D.		Solids		pH
	Before (Total)	After (Soluble)	Before	After	
May 1978					
1	42	183			8.08
2	41		392		
3	33	164			
4	36	200			
5	44	214	620	572	
6	48	210	504	492	
7	44	190	584	472	
8	60	181			
9	44	165			
10	36	177			
11	32	156	708	612	7.97
12	72	--			8.13
16	39	229	556	528	7.22
17	39	225	704	540	--
18	36	497	508	472	--
19	47	185	700	504	--
20	32	205	672	520	7.82
21	51	245	588	440	6.85
22	55	197	532	492	--
23	43	196	456	540	7.85
24	77	203	636	476	7.67
25	53	220	536	424	7.72
26	52	218	456	360	--
27	36	264	420	304	7.73
28	38	216	612	280	7.84
29	36	212	400	344	7.82
30	38	198			8.06
31	34	194	416	376	8.04

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3/8"

PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-32 (continued)

Date	C.O.D.		Solids		pH
	Before (Total)	After (Soluble)	Before	After	
June 1978					
1	30	186	472	376	7.93
2	38	196	504	360	7.82
3	30	246	496	436	7.71
4	32	189	548	468	7.78
5	40	173	620	536	7.71
6	36	383	540	404	7.71
7	37	213	496	344	7.76
8	33	205	608	360	7.74
9	25	201	540	324	7.87
10	29	241	428	336	7.87
11	28	237	368	336	8.24
12	40	245	440	352	8.18
13	40	249	520	356	8.30
14	35	209	648	556	8.23
15	30	177	596	408	8.07
16	33	--	632	--	8.17

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3/8"

PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-33. DATA FOR FLUORENE BATCH REACTOR

Date	C.O.D.		Solids		pH
	Before (Total)	After (Soluble)	Before	After	
January 1978					
10	51				7.56
13	39	240	416	312	
14	39				8.22
15	31	224	436	300	
17	35	575	432	328	
20	60				
22	40	256	408	324	8.23
24	42	364	444	340	8.20
27	56	256	444	292	7.99
29			376	296	
31			420	352	
February 1978					
2					7.62
5	39	233			
7	45	232	496	288	7.96
9	48	238	464	328	
12	47	217	404	284	8.03
14	39		420	236	
16	30				
18	18	236	480	340	8.90
20	34				8.98
22	48	313			7.97
26	36	238	436	320	8.05
28	68	230	416	256	

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3/8"

PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-33. (continued)

Date	C.O.D.		Solids		
	Before (Total)	After (Soluble)	Before	After	pH
March 1978					
2	36	233	384	352	
5	48	241	416	316	7.77
7	40	213	448	360	
9	51	224	456	364	
11	43				7.84
13	51	228	376	304	
16	39				8.17
17	24				
19	40	217	468	348	
21	28	241	424	316	8.24
23	23				
25	67	235	292	212	8.10
27	31	195	432	288	
30			444	412	
April 1978					
1			284	156	
4	65	258	216	192	
7	40				
9	40	247	336	224	
11	40	243	340	272	
13	48	232	396	312	
15	36	260	440	340	8.17
17	40	208			8.17
19	56	212	384	364	8.01
21		328	396	312	8.05
23	60	252	364	340	8.15
25	28	196			8.17
27	30	195	492	428	8.17
29	42	195			8.18

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PAGE NUMBER
EPA-287 (Cin.)
(4-76)

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TABLE A-33 (continued)

Date	C.O.D.		Solids		pH
	Before (Total)	After (Soluble)	Before	After	
May 1978					
1	42	195	300	296	8.12
2	53				
3	41	193			
4	44	236	440	412	
5	44	314	564	460	
6	48	266	488	376	
7	65	234	476	344	
8	56	233	388	316	
9	52	205	412	364	
10	36	209			
11	40	232	700	488	7.98
12	56	--			8.13
16	39	237	532	492	7.20
17	31	209	688	568	--
18	36	241	580	452	
19	51	201	748	500	
20	39	229	824	468	7.92
21	51	172	616	440	6.90
22	47	185	556	506	
23	47	213			7.87
24	81	220	684	444	7.70
25	45	232	556	416	7.80
26	56	226	484	440	--
27	36	236	464	348	7.84
28	36	204	416	352	7.94
29	32	200	440	392	7.85
30	42	190	548	416	8.06
31	34	198	432	372	8.04

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3/8"

PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-33. (continued)

Date	C.O.D.		Solids		pH
	Before (Total)	After (Soluble)	Before	After	
June 1978					
1	30	182	492	372	8.0
2	34	198	576	360	7.8
3	24	265	460	384	7.8
4	28	205	512	420	7.8
5	36	153	544	472	7.8
6	36	310	560	372	7.8
7	33	233	448	336	7.8
8	25	217	604	332	7.9
9	29	193	516	308	7.9
10	25	245	424	308	7.9
11	32	261	364	240	8.3
12	28	241	416	352	8.2
13	48	253	520	336	8.2
14	30	205	476	352	8.3
15	35	189	604	384	8.1
16	41	--	652	--	8.1

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PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-34. SUBSTRATE REMOVAL RATE DATA FOR HEXACHLOROETHANE AND FLUORENE REACTORS

	Control		Fluorene		Hexachloroethane	
Time Hr.	Soluble COD	Solids	Soluble COD	Solids	Soluble COD	Solids
Toxic concentration = 5 mg/l						
0	361	348	381	392	373	328
1.0	263	492	236	452	295	396
3.5	189	516	185	488	236	712
6.0	185	504	177	484	208	904
8.0	177	456	177	460	196	612
10.0	185	448	169	468	185	588
19.5	157	412	161	424	173	404
24.0	134	432	141	392	157	380
Toxic concentration = 25 mg/l						
0	232	432	244	436	265	416
0.5	100	544	112	512	156	480
2.25	64	544	68	548	72	520
4.0	64	540	64	544	64	536
6.0	60	556	64	540	64	528
7.0	60	560	60	544	64	532
8.5	56	588	56	532	60	480
10.0	56	552	52	528	52	532
11.5	52	520	52	496	56	504
19.0	44	512	44	496	48	480
24.0	40	500	44	528	36	420
Toxic concentration = 50 mg/l						
0	270	212	270	216	335	224
0.5	371	184	366	252	366	260
2.0	226	268	101	300	85	320
4.0	61	284	56	304	56	292
5.5	65	300	56	300	85	316
8.0	60	240	52	304	56	382
10.0	60	252	52	276	56	268
20.75	60	228	60	280	56	248
23.0	56	280	48	288	56	268

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PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-35. HEXACHLOROETHANE AND FLUORENE BATCH STRIPPING DATA

Time	Fluorene COD, mg/l.			Hexachloroethane COD, mg/l		
Hour	250 mg/l.	500 mg/l	1000 mg/l	250 mg/l	500 mg/l	1000 mg/l
Test 1						
0	140	184	408	8	8	37
1	97	220	706	--	--	--
6	108	241	667	16	20	37
12	112	184	677	16	16	32
18	144	140	610	--	--	--
21	97	140	674	8	16	21
Test 2						
0	140	304	640	7	14	18
1	--	--	--	11	11	14
6	160	396	661	40	7	19
12	172	280	725	18	22	10
18	--	--	--	11	11	19
21	160	320	795	22	11	24

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PAGE NUMBER

EPA-287 (Cin.)
(4-76)

TABLE A-36. CONTROL DATA FOR BATCH METHYLENE CHLORIDE AND CARBON TETRACHLORIDE STUDIES

Date	C.O.D.		Solids		pH
	Before (Total)	After (Soluble)	Before	After	
July 1978					
24	45	185	524	440	
26	49	253	480	348	
28	40	284	452	324	
30	20	264	468	338	
August 1978					
1	44	252	508	344	8.0
2	47	--	--	--	8.0
3	42	236	480	320	7.7
5	32	228	462	300	8.2
7	32	216	456	316	8.1
9	36	224	436	308	7.8
11	36	220	440	304	8.0
13	36	220	436	312	7.0
15	60	236	452	320	8.0
17	40	231	472	328	8.0
19	36	215	--	328	
21	32	231	472	--	8.0
23	124	280	484	328	7.8
25	--	240	452	304	7.6
27	100	252	392	224	7.9
29	68	288	--	224	8.0
31	72	248	316	236	8.2

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PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-36. (continued)

Date	C.O.D.		Solids		pH
	Before (Total)	After (Soluble)	Before	After	
September 1978					
2	48	244	312	212	8.2
4	53	248	288	192	8.3
5	--	252	--		
6	85	231	355	240	7.9
8	57	284	440	344	8.0
10	50	278	636	364	7.8
12	54	228	432	288	
14	41	237	395	270	8.0
16	--	216	345	295	7.9
18	52	276	495	345	8.0
20	44	236	445	330	7.8
22	45	263	475	390	7.6
24	58	313	435	385	7.6
26		268	440	310	7.8
28	60	385	280	250	7.9
30	56	--	570	350	7.9
October 1978					
4	44	229	425	330	7.7
6	36	256	455	380	8.0
8	36	228	620	405	8.0
10	36	204	580	395	7.9
12	36	236	445	280	7.9
13	36				
14	66	230	545	400	7.8
16	46	226	535	350	7.7
18	42	370	535	355	7.7
20	39	234	445	375	7.9
22	26	222	505	435	7.8
24	39	218	460	315	8.0
26	40	236	425	315	
28	56	296	450	320	8.3
30	36	232	510	420	8.0

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PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-36 (continued)

Date	C.O.D.		Solids		
	Before (Total)	After (Soluble)	Before	After	ph
November 1978					
1	40	268	530	460	7.5
3	36	262	545	455	8.2
5	40	252	705	385	8.0
7	37	252	485	385	8.2
9	36	248	560	430	8.0
11	39	217	570	375	8.0
13	49	246	515	330	8.2
14	37	230	545	415	7.9
15	25	193	480	355	8.0
16	28	--			7.1
18	32	248	580	425	8.1
19	36	226	470	320	7.8
22	28	226	570	425	7.7
23	28	206	535	405	7.6
26	31	221	490	345	8.3
27	34	223	455	315	8.3
30	42	228	610	380	8.1
December 1978					
1	--	--	485	345	7.7
4	73	258	475	325	7.6
5	49	244	430	300	
8	34	217	445	350	7.7
9	38	245	440	375	7.9
12	56	280	540	400	7.9
13	48	268	570	350	8.2
14	76	--		--	8.0
16	68	310	520	295	7.7
17	56	320	400	320	7.6
19	[illegible]	304	445	320	7.5
20	60	--		--	7.7

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PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-37. DATA FOR METHYLENE CHLORIDE REACTOR

Date	C.O.D.		Solids		pH
	Before (Total)	After (Soluble)	Before	After	
July 1978					
24	43	180	472	392	
26	--	253	472	316	
28	42	272	444	344	
30	32	260	452	324	
August 1978					
1	48	248	512	348	8.0
2	39	--		--	8.0
3	34	223	456	328	7.8
5	32	228	432	292	8.2
7	40	220	440	312	8.1
9	37	228	408	296	7.8
11	36	232	504	292	8.0
13	36	212	456	312	7.0
15	32	244	440	304	7.9
17	45	239	460	328	8.0
19	36	223	480	284	7.9
21	32	231	472	288	7.9
23		304	472	320	7.9
25	96	256	432	284	7.5
27	84	260	340	232	7.9
29	68	280	--		8.1
31	68	256	368	236	8.2

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PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-37. (continued)

Date	C.O.D.		Solids		pH
	Before (Total)	After (Soluble)	Before	After	
September 1978					
2	52	244	316	208	8.2
4	49	256	296	208	8.3
5	--	247	--		
6	49	239	515	260	7.9
8	45	276	452	432	8.2
10	58	278	560	352	8.0
12	50	220	448	332	
14	37	249	440	275	8.0
16	44	232	345	325	8.0
18	36	232	450	375	8.0
20	37	248	520	375	7.9
22	49	239	575	435	7.6
24	41	309	480	455	7.7
26	52	240	525	390	7.8
28	36	252	450	375	7.8
30	40	218	525	415	7.8
October 1978					
4	41	229	600	350	7.7
6	28	256	475	350	7.9
8	32	216	605	390	7.9
10	48	212	540	405	7.9
12	36	192	475	365	7.9
13	36	--		--	
14	46	234	480	350	7.9
16	38	226	545	360	7.6
18	38	226	545	360	7.7
20	43	255	410	340	7.8
22	35	226	450	405	7.8
24	39	214	445	310	8.0
26	32	236	400	310	
28	32	264	430	290	8.3
30	36	--	595	400	8.1

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PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-37 (continued)

Date	C.O.D.		Solids		pH
	Before (Total)	After (Soluble)	Before	After	
November 1978					
1	36	252	490	440	7.5
3	56	236	540	445	8.1
5	36	268	585	395	7.8
7	45	237	510	390	8.1
9	45	264	595	460	8.0
11	41	211	540	370	8.0
13	45	242	450	315	7.9
14	33	211	495	380	7.9
15	16	275	475	380	7.9
16	28	--		--	7.1
18	32	248	550	400	8.1
19	48	226	425	290	8.0
22	28	238	535	385	7.8
23	32	254	--		7.6
26	32	265	445	330	8.3
27	33	223	435	330	8.2
30	48	236	--	--	8.1
December 1978					
1	37	261	460	350	7.6
4	68	254	435	285	7.7
5	45	248	375	280	
8	47	213	410	345	7.7
9	38	--	410	360	7.9
12	40	276	570	395	7.9
13	56	268	545	345	8.2
14	60	--		--	7.9
16	76	280	490	295	7.8
17	60	300	430	280	7.7
19	78	312	440	325	7.5
20	88	--	410	--	7.8

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PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-38. DATA FOR CARBON TETRACHLORIDE REACTOR

Date	C.O.D. Before (Total)	C.O.D. After (Soluble)	Solids Before	Solids After	pH
July 1978					
24	37	175	516	432	
25	43	236	488	352	
28	28	240	436	360	
30	36	260	448	344	
August 1978					
1	36	252	492	348	8.0
2	47	--		--	8.0
3	50	216	460	324	7.8
5	32	224	448	240	8.2
7	32	224	452	324	8.1
9	36	208	468	328	7.9
11	40	226	464	316	8.0
13	32	212	480	320	6.9
15	44	240	432	308	7.9
17	36	243	448	316	8.0
19	40	223	428	308	7.9
21	40	231	480	300	8.0
23		292	472	328	7.9
25	92	296	420	280	7.5
27	68	268	388	236	8.0
29	64	284	364	236	8.2
31	52	248	548	252	8.2

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EPA-287 (Cin.)
(4-76)

TABLE A-38 (continued)

Date	C.O.D.		Solids		
	Before (Total)	After (Soluble)	Before	After	pH
September 1978					
2	52	244	336	232	8.2
4	53	248	312	220	8.3
5	--	--	--	236	--
6	53	231	430	295	7.8
8	53	308	532	388	8.1
10	50	278	568	380	7.9
12	50	212	452	352	--
14	41	245	435	285	8.0
16	--	228	415	295	7.9
18	52	236	415	280	7.8
20	60	268	370	240	7.7
22	53	267	550	300	7.6
24	53	317			7.6
26	52	252	545	315	7.7
28	64	264	490	305	7.8
30	52	235	525	380	7.8
October 1978					
4	36	--	490	325	7.7
6	32	268	470	370	7.9
8	28	232	605	400	7.9
10	32	216	660	335	7.9
12	36	240	445	290	7.8
13	32				
14	46	--	500	365	7.9
16	42	230	565	360	7.6
18	34	230	515	375	7.7
20	39	222	425	350	7.8
22	31	226	475	395	7.9
24	39	222	425	320	8.0
26	--	244	310		
28	40	292	405	285	8.2
30	32	236	475	365	8.0

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PAGE NUMBER
EPA-287 (Cin.)
(4-76)

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TABLE A-38 (continued)

Date	C.O.D. Before (Total)	C.O.D. After (Soluble)	Solids Before	Solids After	pH
November 1978					
1	36	238	500	460	7.0
3	52	252	550	455	8.1
5	32	238	570	385	7.9
7	43	246	445	385	8.0
9	44	256	605	450	8.0
11	43	207	570	400	8.0
13	45	246	440	320	8.0
14	33	205	485	385	7.9
15	27	283	520	375	8.0
16	--			--	7.1
18	28	236	450	370	8.2
19	44	230	400	275	8.0
22	28	250	--		7.8
23	21	252	490	365	7.6
26	25	245	460	310	8.3
27	34	218	425	285	8.2
30	44	232	580	415	8.1
December 1978					
1	37	265	485	355	7.6
4	66	250	405	270	7.5
5	49	255	360	258	--
8	49	237	360	290	7.7
9	47	273	330	320	7.9
12	44	280	405	345	7.8
13	56	268	605	300	8.2
14	72	--			7.9
16	72	306			7.7
17	78	320	400	300	7.7
19	112	318	375	320	7.5
20	76	--			7.7

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EPA-287 (Cin.)
(4-76)

TABLE A-39. SUBSTRATE REMOVAL RATE DATA FOR METHYLENE CHLORIDE AND CARBON TETRCHLORIDE REACTORS

Time Hour	Control		Methylene Chloride		Carbon Tetrachloride	
	COD	Solids	COD	Solids	COD	Solids
Toxic concentration = 5 mg/l						
0	252	344	248	348	252	348
1	60	516	64	508	60	524
3	48	508	44	512	48	524
6	40	508	48	500	44	500
10	55	480	51	484	55	476
17	47	444	51	448	39	448
24	47	676	39	472	47	492
Toxic concentration = 25 mg/l						
0	248	192	256	208	248	226
0.5	196	240	184	256	152	264
1.0	146	232	134	264	65	356
2.0	89	272	65	312	61	300
5.25	49	292	77	280	53	348
9.75	53	272	49	312	57	292
17.25	53	244	57	328	45	292
24	53	288	49	296	33	312
Toxic concentration = 50 mg/l						
0	280	236	365	192	290	240
0.5	510	72	490	64	470	32
1.0	485	44	490	52	470	60
2.0	480	52	530	48	470	48
5.0	415	44	395	36	410	40
11	460	40	445	44	450	72
18	425	36	420	36	415	36
24	450	36	445	32	445	32

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3/8"

EPA-287 (Cin.)
(4-76)

TABLE A-40. METHYLENE CHLORIDE BATCH STRIPPING DATA

Time Minute	COD mg/l	COD mg/l
0	73	235
5	--	113
15	20	53
30	20	
108	16	

Air flow rate = 1500 cc/hour

TABLE A-41. CARBON TETRACHLORIDE BATCH STRIPPING DATA

Time Minute	TOC mg/l
0	24
4	5
9	--
15	3
26	3

Air flow rate = 2000 cc/hour

EPA-287 (Cin.)
(4-76)

TABLE A-42. CONTROL DATA FOR BATCH CHLOROFORM AND TRICHLOROETHYLENE STUDIES

Date	C.O.D.		Solids		
	Before (Total)	After (Soluble)	Before	After	pH
July 1978					
24	37	193	456	384	
26	45	253	428	336	
28	24	180	432	416	
30	52	264	436	332	
Aug. 1978					
1	36	252	468	324	8.0
3	34	219	424	308	7.8/7.3
5	32	224	416	308	8.1/7.3
7	28	228	424	300	8.1
9	36	224	444	320	7.9/7.4
11	36	232	420	300	8.0
13	32	22	432	304	6.9/7.3
15	44	244	408	276	7.8
17	49	227	464	292	8.0/7.4
19	36	227	424	276	7.8/7.4
21	40	211	436	280	7.9/7.4
23	132	292	404	248	7.8/7.3
25	48	244	448	228	7.6/7.4
27	56	268	432	216	8.1/7.4
29	52	272	---	---	8.0/7.3
31	44	260	372	264	8.1/7.5
Sept. 1978					
2	44	220	416	292	8.0/7.7
4	41	252	396	284	8.1
6	49	235	505	270	7.9
8	49	284	516	336	8.0/7.5
10	50	274	552	360	7.9/7.5
12	50	195	456	352	7.6
14	33	270	395	300	8.0/7.5
16	36	228	410	345	7.9/7.4
18	68	336	510	370	8.0
20	40	272	375	300	7.8
22	41	255	490	355	7.7/7.4
24	41	304	560	400	7.8/7.4
26	48	252	560	370	7.7/7.4
28	48	220	460	295	7.7
30	45	235	535	350	7.7/7.5

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EPA-287 (Cin.)
(4-76)

TABLE A-42. (Continued)

Date	C.O.D.		Solids		
	Before (Total)	After (Soluble)	Before	After	pH
Oct. 1978					
2	41	229	430	340	7.9/7.5
4	41	252	470	305	7.7/7.6
6	36	236	445	370	8.0
8	30	204	490	410	7.9
10	28	204	625	410	7.4/7.8
12	32	240	470	345	7.9
14	34	250	525	390	7.9
16	38	234	555	350	7.8
18	38	226	505	340	7.7/7.3
20	26	222	405	355	7.7/7.2
22	39	226	515	435	7.6/7.4
24	26	206	465	300	8.0
26	36	244	365	305	
28	36	268	375	315	7.2/7.8
30	32	236	535	365	8.0/7.6
Nov. 1978					
1	40	236	530	470	7/7/7.3
3	36	256	670	475	8.0
5	42	280	790	405	7.9
7	41	237	595	405	7.9/7.6
9	56	252	575	435	8.0/7.7
11	37	225	---	---	8.0/7.8
13	45	250	460	320	7.9/7.6
14	35	207	570	380	8.0
15	26	270			8.1/7.5
16	--	212	---	---	
18	28	236	360	295	8.3/7.6
19	36	238	350	275	7.9/7.4
22	24	262	505	350	7.8/7.4
23	36	256	485	350	7.6/7.2
26	29	236	425	295	8.2
27	26	221	410	290	8.3/7.7
30	42	240	535	390	8.1/7.7

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3/8"

PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-42. (Continued)

Date	C.O.D.		Solids		
	Before (Total)	After (Soluble)	Before	After	pH
Dec. 1978					
1	30	257	455	325	7.4
4	57	269	370	275	7.6
5	53	262	350	245	7.4/7.4
8	51	245	410	305	7.7
9	44	288	395	335	7.9/7.3
12	36	300	445	350	7.8/7.4
13	64	276	500	310	8.2
16	76	296	590	300	7.8/7.3
17	78	316	335	315	7.6
19	60	304	425	285	7.5/7.3
20	96	---	380	---	7.8

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EPA-287 (Cin.)
(4-76)

TABLE A-43. DATA FOR CHLOROFORM BATCH REACTOR

Date	C.O.D		Solids		
	Before (Total)	After (Soluble)	Before	After	pH
July 1978					
24	41	185	520	452	
26	41	253	484	360	
28	20	156	456	460	
30	44	268	440	328	
August 1978					
1	36	268	464	332	8.0
3	34	240	468	316	7.8
5	32	244	396	288	8.1
7	32	240	440	312	8.2
9	32	220	416	320	7.9
11	36	236	456	284	7.9
13	28	236	468	296	7.1
15	40	244	428	292	7.9
17	32	239	496	328	8.0
19	32	223	464	296	8.0
21	32	255	404	274	7.9
23	148	300	428	292	7.8
25	80	288	424	224	7.6
27	52	264	328	192	8.2
29	52	280	---	---	8.3
31	48	256	400	260	8.2

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3/8"

PAGE NUMBER
EPA-287 (Cin.)
(4-76)

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TABLE A-43. (Continued)

Date	C.O.D.		Solids		
	Before (Total)	After (Soluble)	Before	After	pH
Sept. 1978					
2	45	232	444	280	8.0
4	45	260	376	296	8.1
6	45	239	455	330	7.9
8	41	280	508	412	8.1
10	50	290	512	376	7.9
12	33	212	492	380	
14	37	270	455	305	7.9
16	36	216	355	305	7.9
18	56	260	480	380	8.0
20	64	260	365	310	7.8
22	41	251	545	360	7.7
24	41	304	495	465	
26	48	256	530	360	7.8
28	--	276	460	330	7.7
30	37	214	510	360	7.7
Oct. 1978					
2	25	233	440	340	7.9
4	24	232	460	350	7.7
6	36	212	475	445	8.0
8	24	176	545	485	7.9
10	28	192	580	405	7.8
12	24	252	465	350	7.9
14	34	254	490	370	7.9
16	42	234	550	375	7.8
18	34	258	495	365	7.7
20	31	230	445	380	7.8
22	39	222	465	425	7.5
24	35	234	445	325	8.0
26	36	236	395	310	
28	36	272	445	340	8.2
30	32	244	460	375	8.0

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3/8"
PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-43. (Continued)

Date	C.O.D.		Solids		
	Before (Total)	After (Soluble)	Before	After	pH
Nov. 1978					
1	40	240	540	450	7.7
3	36	248	710	525	8.0
5	56	272	625	430	7.9
7	33	246	565	455	7.9
9	53	276	595	490	8.0
11	41	217	595	375	8.1
13	45	250	500	330	7.9
14	33	221	520	365	7.9
15	42	127	480	360	8.1
16	--	278	---	---	---
17	--	---	---	---	---
18	32	244	320	255	8.4
19	36	230	325	235	7.9
20	--	---	---	---	---
21	--	---	---	---	---
22	32	274	485	320	7.8
23	36	269	460	320	7.6
26	29	238	450	280	8.3
27	24	236	420	260	8.2
30	46	246	565	390	8.2
Dec. 1978					
1	41	267	465	345	7.6
4	49	261	430	295	7.7
5	53	258	390	280	7.4
8	45	209	485	415	7.7
9	44	273	455	400	8.0
12	40	284	520	425	7.9
13	52	276	530	375	8.3
16	72	296	585	325	7.9
17	70	308	435	330	7.8
18	80	320	445	325	7.6
20	76	---	420	---	7.8

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BOTTOM OF IMAGE AREA; OUTSIDE DIMENSION FOR TABLES AND ILLUSTRATIONS

3/8"

PAGE NUMBER

EPA-287 (Cin.)
(4-76)

TABLE A-44. DATA FOR TRICHLOROETHYLENE BATCH REACTOR

Date	C.O.D.		Solids		
	Before (Total)	After (Soluble)	Before	After	
July 1978					
24	37	163	484	420	
26	45	228	504	360	
28	28	172	448	440	
30	44	248	424	336	
Aug. 1978					
1	44	256	452	320	8.0
3	34	236	412	312	7.8
5	32	224	376	296	8.1
7	36	232	436	288	8.1
9	36	224	400	308	7.9
11	34	236	452	280	7.9
13	36	224	448	329	6.9
15	32	236	436	296	7.9
17	20	231	468	340	8.1
19	36	227	436	304	7.9
21	36	235	428	284	7.9
23	120	296	432	296	7.9
25	36	240	444	288	7.6
27	64	268	376	236	8.0
29	56	284	364	236	8.2
31	56	260	320	232	8.2

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3/8"

PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-44. (Continued)

Date	C.O.D. Before (Total)	C.O.D. After (Soluble)	Solids Before	Solids After	pH
Sept. 1978					
2	40	256	324	220	8.0
4	43	268	328	260	8.1
6	49	231	500	210	7.9
8	53	284	452	360	8.1
10	50	282	460	376	7.9
12	37	216	472	352	
14	37	266	480	305	7.9
16	36	228	360	330	7.9
18	52	248	455	370	7.2
20	49	260	395	285	7.7
22	62	263	530	295	7.5
24	70	309	405	400	
26	--	272	435	285	7.8
28	48	272	375	295	7.8
30	53	243	470	85	7.7
Oct. 1978					
2	37	220	450	340	8.0
4	41	260	450	320	7.8
6	40	204	450	435	8.0
8	44	244	600	380	7.9
10	28	160	540	350	7.9
12	40	260	460	330	7.8
14	34	254	465	350	7.9
16	38	230	520	330	7.6
18	38	234	440	330	7.7
20	26	230	385	355	7.8
22	39	222	430	405	7.6
24	35	230	420	310	8.0
26	32	236	390	315	
28	32	280	465	315	8.2
30	32	228	540	410	7.9

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BOTTOM OF IMAGE AREA; OUTSIDE DIMENSION FOR TABLES AND ILLUSTRATIONS

3/8"

PAGE NUMBER

EPA-287 (Cin.)
(4-76)

TABLE A-44 (continued)

Date	C.O.D.		Solids		
	Before (Total)	After (Soluble)	Before	After	pH
Nov. 1978					
1	32	248	530	450	7.7
3	40	236	585	470	8.0
5	32	280	565	445	7.9
7	35	240	505	415	7.9
9	37	280	615	505	8.0
11	37	221	545	390	8.0
13	45	254	420	315	7.9
14	27	205	450	390	7.9
15	34	131	460	360	8.2
16	--	184	--		
18	28	240	335	280	8.4
19	36	230	320	245	7.8
22	28	262	470	335	7.8
23	36	252	465	340	7.7
26	45	236	425	280	8.3
27	24	236	505	280	8.2
30	40	216	540	410	8.2
Dec. 1978					
1	30	261	445	360	7.6
4	45	250	385	320	7.7
[illegible]	41	244	365	265	7.5
8	43	184	545	470	7.7
9	44	272	490	415	7.8
12	44	280	560	460	7.9
13	48	280	615	390	8.1
14	--	---			7.6
16	60	276	445	305	7.8
17	48	304	410	325	7.7
19	64	288	460	335	7.6
20	72	---	395	---	7.8

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3/8"
PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-45

SUBSTRATE REMOVAL RATE DATA FOR CHLOROFORM & TRICHLOROETHYLENE REACTORS

	Control		Chloroform		Trichloroethylene	
Time Hr.	Soluble COD	Solids	Soluble COD	Solids	Soluble COD	Solids
Toxic Concentration = 5 mg/l						
0	252	324	268	332	256	320
1	60	512	52	524	68	488
3	40	496	44	516	48	480
6	44	480	40	488	44	472
10	43	448	47	436	47	448
17	39	440	43	456	43	432
24	47	484	39	468	43	468
Toxic Concentration = 25 mg/l						
0	248	236	244	284	260	220
0.5	113	364	109	388	170	284
1.0	61	400	69	396	109	288
2.0	49	412	45	396	53	324
5.5	49	369	57	392	45	348
10.0	57	360	49	380	57	316
17.0	53	364	49	368	97	292
24.0	41	396	45	376	53	328
Toxic Concentration = 50 mg/l						
0	240	345	252	350	260	330
0.5	60	485	56	505	60	490
1.0	44	465	32	475	52	490
2.0	44	445	44	485	48	435
5.0	40	435	36	435	40	410
11.0	40	455	40	430	44	410
18.0	40	455	32	470	36	470
24.0	36	455	40	425	40	435

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3/8"

EPA-287 (Cin.)
(4-76)

TABLE A-46. TRICHLOROETHYLENE BATCH STRIPPING DATA

	Trichloroethylene		
	250 250 mg/l	500 500 mg/l	1000 1000 mg/l
Time Hr.	COD	COD	COD
0	68	180	576
5 min.	40	76	216
15 min.	24	42	52
30 min.	16	16	28
1 Hr.	12	12	12
6 Hr.	8	8	12
24 Hr.	12	12	12

6-1/2"

Air Flow Rate = 2000 cc/min.

9-1/8"

TABLE A-47. CHLOROFORM BATCH STRIPPING DATA

	Chloroform		
	250 250 mg/l	500 500 mg/l	1000 1000 mg/l
Time Hr.	COD	COD	COD
0 Hr.	28	64	124
5 min.	24	32	92
15 min.	20	36	60
30 min.	8	24	40
1 Hr.	20	20	36
6 Hr.	16	24	32
24 Hr.	16	24	32

Air Flow Rate = 2000 cc/min

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3/8"

EPA-287 (Cin.)
(4-76)

TABLE A-48
CONTROL DATA FOR BATCH CHLOROBENZENE AND TETRACHLOROETHYLENE STUDIES

Date	C.O.D.		Solids		pH
	Before (Total)	After (Soluble)	Before	After	
July 1978					
24	61	193	476	448	
26	55	242	504	372	
28	28	232	444	388	
30	32	256	456	320	
August 1978					
1	48	276	480	340	8.0
2	43	---		---	8.0
3	46	227	456	316	7.8
5	32	224	392	304	8.1
7	48	224	460	324	8.1
9	36	212	408	308	7.9
11	40	---	456	284	8.0
13	40	212	460	312	
15	40	232	436	324	7.8
17	40	235	460	340	8.0
19	45	231	404	304	7.9
21	40	239	436	348	7.9
23		324	432	300	7.9
25	68	256	408	228	7.6
27	60	252	---		8.1
29	52	280	368	268	8.2
31	60	252	492	260	8.1

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3/8"

PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-48 (Continued)

Date	C.O.D. Before (Total)	C.O.D. After (Soluble)	Solids Before	Solids After	pH
Sept. 1978					
2	44	256	356	264	8.0
4	53	256	352	272	8.0
6	45	239	520	290	7.9
8	49	276	608	372	8.1
10	50	266	496	412	7.9
12	46	207	456	316	
14	41	253	435	285	7.9
16		245	385	320	7.8
18	56	325	510	325	7.7
20	60	235	365	235	7.6
22	53	310	510	310	7.6
24	49	385			7.6
26	40	335	635	335	7.7
28	44	285	---		
30	52	370	510	370	7.8
Oct. 1978					
2	37	245	480	370	8.0
4	33	220	470	330	7.8
6	36	272	470	320	8.0
8	80	180	560	365	7.9
10	36	232	495	325	7.9
12	40	240	475	330	7.9
14	38	238	510	360	7.9
16	46	224	510	380	7.6
18	46	222	485	370	7.7
20	31	242	450	360	7.8
22	39	218	505	435	7.7
24	39	218	420	310	8.0
26	36	236	360	265	
28	36	304	365	250	8.2
30	36	228	555	435	8.0

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EPA-287 (Cin.)
(4-76)

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TABLE A-48 (Continued)

Date	C.O.D.		Solids		
	Before (Total)	After (Soluble)	Before	After	pH
Nov. 1978					
1	44	236	545	475	7.5
3	40	236	575	495	8.1
5	36	244	565	410	7.9
7	43	225	475	400	8.0
9	40	252	635	485	8.0
11	45	205	575	395	8.0
13	49	246	440	345	8.0
14	25	217	500	370	7.9
15	40	279	470	360	7.9
16	16				7.2
18	32	232	485	385	8.2
19	36	222	430	300	7.9
22	28	254	550	375	7.8
23	31	252	505	400	7.6
26	29	227	495	310	8.3
27	20	220	425	305	8.3
30	44	228	550	430	8.1
Dec. 1978					
1	33	249	485	375	7.7
4	45	240	420	330	7.6
5	55	250	395	290	7.5
8	47	196	395	370	7.7
9	44	251	395	345	7.9
12	20	292	545	450	7.9
13	48	256	600	390	8.2
14	60	---		---	7.8
16	76	300	485	340	7.9
19	68	316	480	355	7.5
20	44	---	405	---	7.8

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3/8"

PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-49. DATA FOR CHLOROBENZENE BATCH REACTOR

Date	C.O.D. Before (Total)	C.O.D. After (Soluble)	Solids Before	Solids After	pH
July 1978					
24	41	--	488	408	
26	69	212	500	436	
28	24	272	448	400	
30	44	264	436	288	
Aug. 1978					
1	44	252	464	344	8.0
2	55	---		---	8.0
3	50	223	428	304	7.8
5	32	256	564	300	8.1
7	32	212	436	256	8.1
9	60	224	444	320	7.9
11	40	236	412	304	8.0
13	40	216	504	272	7.0
15	40	236	432	316	7.9
17	32	235	424	312	8.0
19	40	219	444	300	7.9
21	40	---	472	280	7.9
23		308	440	320	7.8
25	60	253	400	244	7.6
27	68	256	352	200	8.1
29	60			---	8.2
31	56	248	356	248	8.2

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3/8"

PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-49 (Continued)

Date	C.O.D.		Solids		
	Before (Total)	After (Soluble)	Before	After	pH
Sept. 1978					
2	52	252	376	260	8.0
4	49	260	376	268	8.1
6	53	239	620	310	7.9
8	49	292	516	348	8.1
10	46	278	468	380	7.9
12	40	212	456	344	---
14	37	249	455	295	8.0
16	80	232	455	310	7.9
18	40	244	500	350	7.8
20	76	268	420	235	7.6
22	62	267	575	295	7.7
24	53	309	500	455	7.7
26	40	272	620	305	7.7
28	64	272	---		7.8
30	40	247	575	445	7.8
Oct. 1978					
2	37	239	480	355	8.0
4	45	240	540	310	7.8
6	40	260	470	350	8.0
8	40	248	590	355	7.9
10	36	224	540	375	7.9
12	44	235	415	280	7.7
14	46	254	470	385	7.9
16	54	226	545	375	7.6
18	30	302	515	370	7.7
20	26	238	405	350	7.8
22	26	226	490	450	7.7
24	39	206	430	295	8.0
26	36	236	370	295	
28	32	292	385	280	8.2
30	36	232	565	415	8.0

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3/8"

PAGE NUMBER
EPA-287 (Cin.)
(4-76)

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TABLE A-49 (Continued)

Date	C.O.D.		Solids		
	Before (Total)	After (Soluble)	Before	After	pH
Nov. 1978					
1	36	252	540	455	7.6
3	36	256	645	495	8.0
5	42	236	670	405	7.8
7	45	238	550	440	8.0
9	41	236	630	480	8.0
11	43	217	580	395	8.0
13	41	254	460	340	7.9
14	35	221	555	350	7.9
15	86	279	465	410	7.9
16	28	--		--	7.7
18	28	232	460	350	8.3
19	36	222	385	295	8.0
22	32	260	505	375	7.8
23	29	256	525	370	7.6
26	59	235			8.3
27	20	220	385	295	8.2
30	40	216	550	430	8.1
Dec. 1978					
1	35	261	500	375	7.6
4	24	229	435	340	7.6
5	45	250	425	310	7.5
8	43	213	435	375	7.6
9	48	280	420	360	7.8
12	32	276	525	430	7.9
13	60	268	535	390	8.1
14	80	--		--	
16	84	308	405	280	7.8
19	72	296	420	275	7.6
20	24	--	380	--	7.8

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EPA-287 (Cin.)
(4-76)

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TABLE A-50. TETRACHLOROETHYLENE BATCH REACTOR

Date	C.O.D.		Solids		pH
	Before (Total)	After (Soluble)	Before	After	
July 1978					
24	49	191	520	497	
26	49	232	484	400	
28	28	240	472	404	
30	32	264	460	334	
Aug. 1978					
1	40	264	484	364	8.0
2	39	--		--	8.0
3	--	227	436	344	7.8
5	32	260	412	304	8.1
7	32	376	432	312	8.1
9	28	220	432	304	7.9
11	44	244	396	280	8.0
13	32	232	452	292	6.9
15	40	248	428	288	7.8
17	40	243	444	296	8.0
19	36	223	444	304	7.9
21	40	239	460	260	7.9
23		292	424	284	7.8
25	96	248	388	260	7.6
27	56	268	332	196	8.1
29	52	280	424	268	8.2
31	72	256	384	272	8.2

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3/8"

PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-50. (Continued)

Date	C.O.D.		Solids		
	Before (Total)	After (Soluble)	Before	After	pH
Sept. 1978					
2	44	240	396	280	8.0
4	45	256	388	288	8.1
6	49	--	510	320	7.9
8	41	276	604	400	8.2
10	46	257	584	404	8.0
12	50	199	484	364	--
14	37	245	450	305	7.9
16	32	237	395	285	7.8
18	40	248	460	360	7.8
20	20	280	430	255	7.8
22	53	251	630	350	7.6
24	49	317	455	390	7.7
26	40	252	675	345	7.8
28	92	252	--		7.8
30	52	226	650	415	7.8
Oct. 1978					
2	33	218	530	380	
4	37	224	490	350	7.7
6	36	244	495	385	7.9
8	36	152	600	405	7.9
10	36	212	750	370	8.0
12	40	240	425	320	7.8
14	42	250	485	405	7.9
16	46	234	605	370	7.6
18	38	218	645	410	7.7
20	39	230	415	360	7.7
22	39	218	490	435	7.3
24	35	226	450	325	8.0
26	36	248	390	310	
28	36	280	400	295	8.3
30	56	236	490	395	8.0

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PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-50. (Continued)

Date	C.O.D.		Solids		
	Before (Total)	After (Soluble)	Before	After	pH
Nov. 1978					
1	36	268	550	460	7.6
3	32	252	630	460	8.0
5	32	304	540	390	7.9
7	45	236	490	395	7.9
9	37	248	570	465	8.0
11	49	211	585	390	8.0
13		244	785	325	7.9
14	99	213	485	355	7.9
15	34	135	470	340	8.0
16	20	--			7.6
18	16	236	380	305	8.2
19	40	230	380	260	7.9
22	32	258	515	365	7.8
23	34	248	515	365	7.7
26	29	231	445	290	8.3
27	20	224	435	285	8.2
30	42	240	495	390	
Dec. 1978					
1	41	261	495	340	7.5
4	49	258	370	295	7.6
5	61	254	370	260	7.4
8	43	241	400	320	7.6
9	52	273	345	335	8.0
12	40	304	485	350	7.8
13	56	280	560	345	8.2
14	64	--		--	
16	80	292	--		7.8
19	88	308	510	310	7.5
20	48	--	390	--	7.8

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3/8"
PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-51

SUBSTRATE REMOVAL RATE DATA FOR CHLOROBENZENE & TETRACHLOROETHYLENE REACTORS

	Control		Chloro Benzene		Tetrachloro Ethylene	
Time Hr.	Soluble COD mg/l	Solids mg/l	Soluble COD mg/l	Solids	Soluble COD	Solids
Toxic concentration = 25 mg/l						
0.5	156	292	158	300	130	348
1	97	308	105	364	61	404
2.0	49	352	53	372	45	400
5	45	368	65	364	45	440
10	57	356	77	384	61	396
17	61	332	57	312	45	364
Toxic concentration = 50 mg/l						
0	240	330	235	280	240	320
0.5	68	495	80	445	36	380
1	64	470	52	460	56	510
2	48	470	52	465	56	475
5	40	430	44	395	40	445
11	44	450	40	440	52	430
18	36	435	36	425	36	455
24	32	445	44	420	36	465

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3/8"
PAGE NUMBER

EPA-287 (Cin.)
(4-76)

TABLE A-52

CONTROL DATA FOR BATCH ETHYLBENZENE AND 4-CHLORO, 3-METHYL PHENOL STUDIES

Date	C.O.D.		Solids		
	Before (Total)	After (Soluble)	Before	After	pH
Jan. 1979					
23	73	247	410	215	8.5
25	86	---	440	270	8.5
27	51	249	415	290	8.4
29	52	260	390	285	8.3
31	48	206	420	370	8.2
Feb. 1978					
1	60	---	445	---	7.9
3	71	272	440	355	8.3
5	63	261	420	310	7.9
7	61	257	400	320	8.0
9	52	247	405	315	7.9
11	56	244	515	375	8.3
13	64	244	420	340	8.2
15	84	---	370	288	8.3
17	60	269	375	315	7.9
19	55	261	362	305	7.6
21	63	267	460	355	6.7
23	64	272	355	275	7.2
25	64	276	480	370	7.7
27	60	248	485	375	7.6

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PAGE NUMBER
EPA-287 (Cin.)
(4-76)

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TABLE A-52 (Continued)

Date	C.O.D. Before (Total)	C.O.D. After (Soluble)	Solids Before	Solids After	pH
Mar. 1979					
1	55	252	480	360	7.7
3	108	238	415	335	7.5
5	63	234	460	380	7.6
7	59	282	465	350	8.2
9	59	275	505	400	---
11	56	280	450	370	7.6
13	84	260	450	370	7.7
15	76	240	470	380	7.9
17	20	268	515	425	7.9
19	68	273	480	400	7.8
21	51	253	470	465	7.8
23	40	264	450	400	7.9
25	48	222	580	317	8.1
27	52	240	520	390	8.0
29	--	276	445	390	---
31	--	---	510	415	7.6
April 1979					
2	93	220	495	390	7.7
4	117	315	470	370	7.8
6	89	---	555	365	7.8
8	---	264	435	375	7.7
10	---	208	475	420	7.3
12	28	216	580	445	7.6
14	46	242	530	420	7.3
16	54	234	555	370	8.1
19	58	230	405	345	
21	42	232	460	315	7.6
23	48	236	385	380	7.8

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PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-53. DATA FOR ETHYLBENZENE BATCH REACTOR

Date	C.O.D. Before (Total)	C.O.D. After (Soluble)	Solids Before	Solids After	pH
Jan. 1979					
23	73	290	390	350	8.6
25	82	277	420	285	8.5
27	51	255	405	290	8.5
29	60	260	395	295	8.4
31	52	215	405	375	8.2
Feb. 1979					
1	60	---	445	---	8.0
3	71	---	425	350	8.3
5	67	261	410	315	8.0
7	51	261	450	330	8.1
9	44	255	440	360	7.9
11	52	232	485	385	8.6
13	56	232	405	360	8.2
15	76	273	285	288	8.3
17	56	267	385	320	8.0
19	69	257	355	345	7.5
21	53	265	515	380	6.6
23	67	260	470	350	7.2
25	68	268	470	385	7.7
27	52	184	490	380	7.7

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3/8"
PAGE NUMBER

EPA-287 (Cin.)
(4-76)

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TABLE A-53. (Continued)

Date	C.O.D. Before (Total)	C.O.D. After (Soluble)	Solids Before	Solids After	pH
Mar. 1979					
1	55	252	510	370	7.8
3	65	237	450	365	7.6
5	72	234	455	410	7.9
7	64	280	510	370	8.3
9	63	271	510	430	---
11	68	276	435	380	7.6
13	68	---	455	365	7.8
15	64	264	475	405	8.1
17	64	261	470	425	8.0
19	51	277	465	430	8.0
21	60	304	440	490	8.1
23	84	267	445	430	8.1
25	40	244	470	415	7.8
27	56	224	505	415	7.8
29	--	276	475	415	7.8
31	--	208	500	495	7.7
April 1979					
2	69	238	545	400	7.8
4	135	291	470	350	7.9
6		299	555	340	7.8
8	68	272	425	380	7.7
10	28	156	465	370	7.4
12	92	260	580	435	7.6
14	62	244	570	450	7.3
16	50	238	545	390	8.1
19	62	226	340	340	7.7
21	46	234	430	365	7.8
23	68	268	325	305	7.6

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(4-76)

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TABLE A-54. DATA FOR 4-CHLORO, 3-METHYL PHENOL BATCH REACTOR

Date	C.O.D. Before (Total)	C.O.D. After (Soluble)	Solids Before	Solids Solid	pH
Jan. 1979					
23	61	263	480	340	8.6
25	82	---	420	295	8.5
27	57	259	410	270	8.4
29	44	252	395	280	8.3
31	60	219	420	372	8.2
Feb. 1979					
1	60	---	440	---	8.3
3	69	268	425	330	8.3
5	71	277	350	310	7.9
7	63	265	390	285	8.0
9	64	245	370	305	7.8
11	60	248	410	300	8.3
13	68	244	395	285	8.2
15	80	---	325	250	8.4
17	64	275	400	305	7.9
19	69	261	355	290	7.5
21	61	269	405	310	6.7
23	56	272	350	275	7.2
25	76	288	425	355	7.7
27	64	236	525	325	7.7

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3/8"

PAGE NUMBER

EPA-287 (Cin.)
(4-76)

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TABLE A-54 (Continued)

Date	C.O.D. Before (Total)	C.O.D. After (Soluble)	Solids Before	Solids After	pH
March 1979					
1	64	246	525	360	7.9
3	72	257	445	350	7.6
5	70	257	465	385	7.8
7	61	292	465	300	8.3
9	63	301	475	380	
11	52	308	400	325	8.0
13	76	276	425	325	8.3
15	53	284	415	330	8.5
17	72	306	415	350	8.4
19	64	304	460	280	8.4
21	80	294	360	315	8.5
23	56	290	405	330	8.5
25	50	280	380	294	8.1
27	68	260	370	275	8.5
29			295	275	8.2
31	--	--	380	315	8.5
April 1979					
2	69	267	355	270	8.4
4	97	311	355	360	8.4
6	137	309	375	220	8.4
8	92	252	290	245	8.3
10	--	240	330	290	8.3
12	128	240	445	320	8.2
14	58	272	--	245	7.9
15	40	243	325	257	
16	74	302	390	240	8.5
19	68	314	295	240	8.5
21	74	280	325	215	8.4
23	88	300	290	235	8.4

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3/8"

PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-55

CONTROL DATA FOR BATCH 1, 2 DICHLOROETHANE & 1, 1, 2 TRICHLOROETHANE STUDIES

Date	C.O.D. Before (Total)	C.O.D. After (Soluble)	Solids Before	Solids After	pH
January 1979					
23	124	224	435	396	
24	76	236	350	275	8.5
25	78	244	340	230	
26	56	234	340	245	8.6
27	--	186	---	190	
28	20	224	305	240	8.5
29	20	192	230	205	
30	44	256	244	165	8.5
31	48	---	300	265	8.4
Feb. 1979					
2	40	240	235	220	8.3/8.8
4	64	284	365	355	6.8
6	76	312	345	280	6.6
8	36	268	---	---	6.7
10	66	284	305	265	7.4
12	74	324	600	290	7.3
14	60	268	410	370	7.3
16	80	268	410	350	7.4
18	56	228	530	365	6.9
20	62	264	340	345	6.6/6.6
22	52	280	355	230	8.2
24	54	256	445	260	8.3
26	36	240	375	280	8.3
28	62	238	520	330	8.2

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PAGE NUMBER
EPA-287 (Cin.)
(4-76)

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TABLE A-55 (Continued)

Date	C.O.D.		Solids		
	Before (Total)	After (Soluble)	Before	After	pH
March 1979					
2	68	274	485	355	
4	66	288	445	230	6.6
6	60	240	445	360	6.9
8	56	276	405	360	7.4
11	68	286	405	345	7.0
13	70	290	490	380	7.3
15	36	238	475	380	6.6
17	72	288	455	365	6.6
19	48	280	425	405	6.7
21	64	260	455	340	6.8
23	54	280	435	375	6.7
25	54	259	355	285	8.0
27	60	251	410	280	8.2
31	100	320	455	415	6.8
April 1979					
2	96	264	350	345	6.8
4	96	312	490	340	6.7
6	96	302	420	265	7.3
8	84	290	430	330	7.2
10	92	300	450	275	6.3
12	88	320	460	335	6.2
14	84	276	300	280	7.8
16	98	288	385	450	7.0
19	84	256	410	390	8.0
21	80	332	475	260	6.7
23	80	276	375	310	6.6

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3/8"

EPA-287 (Cin.)
(4-76)

TABLE A-56. DATA FOR 1,2 DICHLOROETHANE BATCH REACTOR

Date	C.O.D. Before (Total)	C.O.D. After (Soluble)	Solids Before	Solids After	pH
January 1979					
23	90	264	400	360	
24	84	242	330	265	8.6
25	68	244	350	240	
26	56	260	340	235	8.6
27	--	184	215		
28	10	206	315	190	
29	36	240	280	215	
30	60	224	264	170	8.5
31	32	---	330	260	8.4
Feb. 1979					
2	52	284	335	235	8.5/8.4
4	88	276	325	325	7.7
6	68	302	320	230	6.7
8	64	254	320	320	6.8
10	74	262	350	305	7.4
12	58	338	370	205	7.6
14	80	264	385	300	7.6
16	70	260	355	315	7.8
18	48	260	420	355	7.3
20	68	276	335	290	6.6/6.8
22	44	296	315	215	8.2
24	34	256	450	295	8.4
26	40	238	445	310	8.2
28	52	248	425	295	8.2

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3/8"

PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-56. (Continued)

Date	C.O.D.		Solids		
	Before (Total)	After (Soluble)	Before	After	pH
March 1979					
2	74	256	500	350	6.9
4	56	280	370	255	6.5
6	34	270	465	310	7.1
8	44	276	330	275	7.8
11	66	298	385	275	7.7
13	52	324	425	375	7.4
15	40	248	445	350	6.9
17	56	300	455	395	6.7
19	56	292	495	460	7.2
21	60	260	480	385	7.2
23	63	260	420	355	6.8
25	67	288	465	320	8.1
27	52	238	395	290	7.5
31	92	318	360	335	7.0
April 1979					
2	92	300	370	365	7.0
4	104	300	535	335	7.5
6	120	324	500	305	7.8
8	72	254	495	425	7.6
10	104	300	510	370	7.6
12	92	296	455	400	6.7
14	72	280	415	345	7.2
16	48	224	445	560	6.7
19	58	252	470	510	8.3
21	44	302	530	335	8.4
23	68	304	395	305	8.3

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3/8"
PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-57. DATA FOR 1,1,2 TRICHLOROETHANE BATCH REACTOR

Date	C.O.D.		Solids		
	Before (Total)	After (Soluble)	Before	After	pH
Jan. 1979					
23	172	286	505	320	
24	88	240	395	290	8.5
25	76	262	325	270	
26	60	274	355	275	8.5
27	---	196	---	265	---
28	44	224	375	245	8.4
29	56	220	325	230	
30	48	304	332	210	8.3
31	48	---	350	300	8.2
Feb. 1979					
2	60	270	385	270	8.4/ 8.2
4	60	288	340	350	7.9
6	60	284	355	305	7.1
8	40	264	370	345	7.0
10	68	264	370	355	7.6
12	66	268	485	235	7.8
14	108	312	445	435	7.6
16	52	284	415	375	7.9
18	52	248	495	360	
20	48	284	350	280	6.5/6.7
22	68	276	420	270	8.2
24	32	242	480	390	8.4
26	32	244	445	390	8.3
28	52	256	490	385	8.4

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3/8"

PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-57. (Continued)

Date	C.O.D.		Solids		
	Before (Total)	After (Soluble)	Before	After	pH
March 1979					
2	60	284	585	415	8.0
4	62	280	515	360	7.3
6	68	252	495	380	7.4
8	60	266	465	385	7.8
11	54	292	460	335	7.8
13	64	300	490	400	8.0
15	44	244	450	400	8.1
17	40	304	455	430	8.2
19	40	276	560	525	7.9
21	52	260	585	480	8.2
23	52	260	505	355	7.9
25	42	288	490	345	8.2
27	64	284	468	465	8.2
31	88	340	445	400	7.9
April 1979					
2	60	276	400	400	7.8
4	68	300	515	435	8.2
6	80	296	470	370	8.2
8	62	242	575	395	7.8
10	96	296	525	405	8.2
12	72	324	485	400	7.9
14	68	306	455	360	8.4
16	60	248	420	515	8.4
19	52	228	495	455	8.2
21	36	320	550	370	7.7
23	48	258	405	315	7.8

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PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-58
CONTROL DATA FOR BATCH BROMOFORM AND TETRACHLOROETHANE STUDIES

Date	C.O.D.		Solids		pH
	Before (Total)	After (Soluble)	Before	After	
January 1979					
23	86	290	410	345	8.6/7.5
25	73	---	430	295	8.6/7.5
27	57	253	415	295	8.4/7.7
29	48	252	420	285	8.4
31	--	184	---	320	
Feb. 1979					
3	71	264	420	340	8.4/8.5
5	69	275	410	305	7.9/7.5
7	59	269	410	310	8.1/7.5
9	56	237	435	345	7.9/7.6
11	64	236	465	350	8.4/8.0
13	52	208	435	350	8.3/8.1
15	72	267	355	295	8.3/8.1
17	52	277	410	320	8.0/8.1
19	55	253	420	315	7.8
21	61	273	440	350	6.6/6.6
23	64	256	390	295	7.2/7.3
25	68	280	435	375	7.8/7.4
27	56	244	510	380	7.7/7.4

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3/8"

PAGE NUMBER
EPA-287 (Cin.)
(4-76)

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TABLE A-58 (Continued)

Date	C.O.D.		Solids		
	Before (Total)	After (Soluble)	Before	After	pH
Mar. 1979					
1	61	242	505	375	7.8/7.5
3	78	242	460	355	7.6/7.4
5	59	234	460	385	7.9/7.6
7	59	280	460	360	8.1/7.4
9	75	275	495	405	
11	76	288	510	405	7.5
13	60	236	600	360	7.9/7.4
15	51	256	520	430	8.1/7.4
17	76	268	555	435	7.9
19	51	273	505	410	7.9/7.3
21	35	260	490	485	8.0/7.5
23	--	244	458	400	8.1/7.5
25	36	244	465	375	7.8/7.5
27	56	224	520	410	7.6/7.9
29	36	260	450	385	7.8/7.2
31	48	254	480	385	7.7
April 1979					
1	65	241	485	380	7.8/7.5
4	99	281	460	375	7.8/7.6
6	99	291	550	340	7.8/7.5
8	88	180	400	335	7.7/7.5
10	24	168	470	375	7.3/7.3
12	--	230	480	370	7.5/7.3
14	58	236	505	395	7.3/7.5
16	50	216	500	365	8.1/7.4
18	58	234	380	330	7.8/7.6
21	46	234	430	310	7.7/7.5
23	64	248	350	295	8.1/7.7

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3/8"

PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-59. DATA FOR BROMOFORM BATCH REACTOR

Date	C.O.D.		Solids		
	Before (Total)	After (Soluble)	Before	After	pH
Jan. 1979					
23	88	265	400	330	8.6
25	55	245	440	300	8.5
27	53	247	395	275	8.5
29	76	240	385	290	8.4
31	--	256	--	300	
Feb. 1979					
3	59	272	390	310	8.7
5	55	259	395	275	8.3
7	57	269	405	290	8.0
9	52	253	410	300	7.8
11	68	248	455	355	8.4
13	56	236	425	345	8.3
15	64	261	360	295	8.4
17	60	269	440	325	7.9
19	59	245	395	300	7.8
21	63	273	425	330	6.6
23	72	264	425	320	7.2
25	68	280	425	375	7.8
27	68	236	395	325	7.6

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BOTTOM OF IMAGE AREA; OUTSIDE DIMENSION FOR TABLES AND ILLUSTRATIONS

3/8"

PAGE NUMBER

EPA-287 (Cin.)
(4-76)

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TABLE A-59 (Continued)

Date	C.O.D.		Solids		
	Before (Total)	After (Soluble)	Before	After	pH
Mar. 1979					
1	59	242	455	345	7.8
3	76	252	410	320	7.6
5	70	257	440	365	8.0
7	61	284	455	355	8.2
9	61	288	450	390	
11	80	280	515	450	7.6
13	80	264	505	380	8.1/7.4
15	64	244	505	400	8.4
17	68	230	510	435	8.4
19	43	281	470	410	8.5
21	35	272	480	480	8.5
23	31	240	490	380	8.5/7.5
25	40	212	470	410	8.4/7.5
27	64	252	555	400	8.3/7.9
29	48	264	445	395	7.9
31	48	228	480	395	7.5
Apr. 1979					
2	57	214	480	380	7.9
4	69	267	450	340	7.8
6	95	281	520	320	7.9
8	88	184	395	345	7.7
10	88	208	415	340	7.3
12	108	216	470	210	7.5
14	54	232	515	380	7.4
16	48	224	510	335	8.1
18	48	232	375	345	7.5
21	34	248	445	275	7.6
23	80	260	370	280	8.1

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3/8"

PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-60. DATA FOR TETRACHLOROETHANE BATCH REACTOR

Date	C.O.D.		Solids		pH
	Before (Total)	After (Soluble)	Before	After	
Jan. 1979					
23	67	298	420	335	8.6
25	47	---	400	300	8.5
27	57	249	430	290	8.5
29	44	264	405	310	8.4
31	--	257	---	330	
Feb. 1979					
3	69	264	420	345	8.4
5	63	263	400	325	8.0
7	59	257	405	310	8.1
9	56	241	445	335	7.9
11	64	248	435	365	8.3
13	63	240	385	355	8.3
15	72	263	345	295	8.4
17	56	275	455	340	8.0
19	63	247	390	310	7.8
21	59	273	495	359	6.5
23	60	264	445	335	7.3
25	68	276	460	400	7.8
27	60	228	475	380	7.7

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3/8"

PAGE NUMBER
EPA-287 (Cin.)
(4-76)

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9-1/2"

TABLE A-60 (Continued)

Date	C.O.D. Before (Total)	C.O.D. After (Soluble)	Solids Before	Solids After	pH
March 1979					
1	55	240	520	360	7.9
3	65	255	460	325	7.6
5	74	255	445	370	8.0
7	59	280	470	370	8.2
9	63	275	470	410	
11	72	288	535	425	7.5
13	72	276	510	395	7.9/7.4
15	44	234	525	415	8.2
17	60	253	515	435	8.0
19	51	281	500	425	8.4
21	51	257	445	455	8.2
23	35	259	460	400	8.5/7.5
25	52	236	470	400	8.4/7.5
27	52	---	545	440	8.4/7.9
29	40	272	455	410	8.4
31	44	260	480	415	8.4
April 1979					
2	85	194	490	355	8.4
4	113	261	455	360	8.4
6	--	295	515	295	8.3
8	48	212	380	330	8.0
10	68	180	445	360	7.5
12	128	226	575	400	7.6
14	62	296	500	385	7.4
16	44	226	540	355	8.1
18	54	228	395	360	7.5
21	42	230	455	320	7.7
23	64	252	385	325	8.0

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3/8"

PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-61. CONTINUOUS FLOW CONTROL DATA. θ_c = 5 days

Date	Feed SS	Feed COD TOT	Feed COD FIL	MLSS	Effluent COD TOT	Effluent COD FIL	Effluent Solids
September 1977							
3		328					
4		252			60	56	
5		204		300	72	60	5.0
8		268		705	36	32	2.5
9	64	268	160	1210	48	44	0
10	24	328	244	872	32	32	0
11	48	300	226	685	56	56	2.5
12	28	323	263	948	58	48	0
13	30	327	202	1648	44	44	5
14	68	283	174	1000	56	44	2.5
15	56	364	311	1212			0
16	60	295	267	2448	44	36	2.5
17	56	336	263	2056	40	36	7.5
18	20	323	271	1928	40	32	7.5
19	56	376	271	2036	32	28	2.5
20	44	331	267	1952	32	24	10
21	48	291	234	1628	28	20	4.0
22	16	307	271	2000	40	18	10
23	32	232	212	1592	16		10
24	40	318	208	1488	16	12	2.5
25	48	240	220	2036	12	12	7.5
26	52	368	244	1400	36	24	
27	44	549	388	1340	16	12	0
28	64	336	260	1136	48	44	5
29	32	312		1228	56	52	0
30		332		1164			
October 1977							
1	12	364	268	1200	56	40	2.5
3	40	324	240	1210	32	28	5
5	76	350	235	1368	28	24	2.5
7	12	317	247	1192	32	20	2.5
9	28	333	247	1220	36	32	5
11	56	329	223	1356	178	130	45
14	184	528	247	1284	30	20	2.5
15	72	412	289	1204	57	53	5
17	60	376	250	1264	45	41	0
19	60	368	274	1360	33	33	0

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PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-61 (continued)

Date	Feed SS	Feed COD TOT	Feed COD FIL	MLSS	Effluent COD TOT	Effluent COD FIL	Effluent Solids
October 1977 (continued)							
21	8	246	222	1132	37	33	0
23	8	246	222	1212	37	25	0
25	52	357	260	1120	36	24	0
27	72	369	228	1100	36	36	7.5
29	12	397	289	1120	36	36	0
31	48	357	317	1096	28	28	0
November 1977							
2	44	373	294	1052	40	40	2.5
4	40	393	293	1080	32	32	0
6	32	337	265	1176	32	32	0
8	20	352	265	1104	36	34	0
10	24	361	--	972	36	36	0
12	68	383	278	1212	44	--	7.5
14	12	436	324	1292	48	44	7.5
16	32	420	328	1096	40	40	0
18	32	372	320	1188	40	40	0
20	36	440	340	1196	44	40	0
22	20	428	356	956	36	32	0
24	48	360	288	1040	48	36	12.5
26	48	324	220	1012	48	40	5
28	64	360	260	1052			0
30	32	368	316	792	52	52	2.5
December 1977							
2	12	370	297	940	62	47	
4	4	370	291	948	149	70	5.0
6	112	334	181	852	43	31	7.5
8	44	274	228	800	35	31	7.5
10	28	330	244	520	39	31	5
12	52	338	220	672	31	27	0
14	76	338	232	712	51	43	7.5
16	8	229	200	604	35	35	0
18	8	248	--	588	35	--	0
20	56	206	87	572	51	39	0
22	24	218	150	550	59	51	8

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PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-61 (continued)

Date	Feed SS	Feed COD TOT	Feed COD FIL	MLSS	Effluent COD TOT	Effluent COD FIL	Effluent Solids
December 1977 (continued)							
24	52	269	194	496	63	39	100
26	16	301	261	481	35	27	5
28	20	353	273	608	43	43	0
January 1978							
1		552	432	952	20	20	0
3	82.5	300	212	1068	140	108	25
5	56	304	212	1052	44	44	2.5
7	12	292	236	900	44	44	0
9	120	300	252	1012	36	32	0
11	64	257	206	908	99	51	27.5
13	48	309	244	892	63	31	25
15	40	329	228	792	43	40	2.5
17	164	809	496	1068	142	111	12.5
19	92	246	226	852	142	126	20
21	28	--	--	788	63	59	0
23	108	781	337	872	301	210	10
25	156	416	218	856	154	63	10
27	--	--	--	1108	--	--	5
29	56	356	216	936	44	35	7.5
31	44	392	296	836	52	40	2.5
February 1978							
2	112	800	668	816	44	40	0
4		396	376		240	160	
6	40	336	252	612			
8		376	308		216	212	
10	108	692	680	372	400	56	105
12	104	740	440	444	284	120	52.5
14	12	252	200	308	128	36	57.5
16	76	284	206	328	132	20	57.5
18	48	536	340	448	140	28	70
20	36	--	--	456	--	40	5
24	20	386	--	1064	28	28	0
26	36	326	--	1044	26	18	12
28	24	344	--	1056	32	28	8

(continued)

TABLE A-61 (continued)

Date	Feed			MLSS	Effluent COD		Effluent Solids
	SS	COD					
		TOT	FIL		TOT	FIL	
March 1978							
1	32	780	652	840	56	40	0
3	24	368	312	916	44	44	0
5	32	368	316	948	40	36	0
7	88	360	288	656	56	36	45
9	36	400	316	536	60	52	0
11	56	496	--	708	60	48	2.5
13	32	--	--	744	--	--	0
15	20	--	--	826	--	--	0
17	48	384	300	924	48	44	0
19	24	408	384	1344	60	48	10
21	44	408	316	1324	52	36	2.5
23	92	632	--	860	48	48	0
25	32	245	209	1832	72	52	10
27	36	395	274	1500	32	32	0
29	68	387	326	1660	32	32	0
31	44	270	209	1256	32	32	5
April 1978							
2	48	380	--	860	32	32	3
4	2	376	--	1212	36	36	3
6	36	518	292	1792	46	41	3
8	48	341	308	1440	37	29	0
10	8	337	292	1260	37	24	0
12	32	329	271	1432	20	16	0
14	60	493	308	1448	45	29	3
16	20	353	261	1696	32	28	0
18	60	405	315	1544	40	36	0
20	64	309	232	1684	120	36	43
22	28	220	202	1052	164	28	28
24	48	385	285	856	190	48	108
26	32	341	269	1280	112	44	63
28	52	437	273	836	26	56	115
30	36	381	228	764	132	48	25

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EPA-287 (Cin.)
(4-76)

TABLE A-61 (continued)

Date	Feed			MLSS	Effluent		Effluent Solids
	SS	COD			COD		
		TOT	FIL		TOT	FIL	
May 1978							
2	64	409	372	1124	154	56	53
4	104	348	259	796	150	44	135
6	16	340	299	524	64	32	18
8	56	354	255	788	44	40	0
10	48	352	279	716	44	24	10
12	148	408	348	476	85	40	40
14	76	371	306	540	36	32	20
16	80	391	334	584	89	36	55
18	44	412	351	528	208	52	130
20	32	277	232	548	118	30	78
23	40	583	391	560	81	36	28
25	24	312	--	588	45	36	10
27	52	371	306	772	69	36	15
30	92	432	288	676	132	32	82
June 1978							
1	5	352	229	684	92	32	24
3	88	408	348	684	24	24	12
5	80	356	276	1312	--	36	3
7	28	376	324	784	44	32	8
9	60	328	272	744	34	24	12
11	8	360	284	596	36	36	10
13	72	328	284	804	36	20	20
15	12	456	324	712	36	32	8
17	12	292	240	776	52	40	10
19	24	300	248	624	96	36	78
20	--	324	264	--	40	32	--
21	40	324	264	680	40	32	10
23	28	324	264	624	40	32	--
25	44	435	403	720	--	--	30
27	24	487	403	436	354	88	200
29	36	322	262	380	153	64	82
July 1978							
1	36	359	241	324	165	60	104
3	36	294	254	384	48	40	12
5	28	366	290	488	40	40	2
7	8	342	274	536	56	44	8

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PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-61 (continued)

Date	Feed			MLSS	Effluent COD		Effluent Solids
	SS	COD			TOT	FIL	
July 1978 (continued)							
1	36	359	241	324	165	60	104
3	36	294	254	384	48	40	12
5	28	366	290	488	40	40	2
7	8	342	274	536	56	44	8
9	40	318	278	572	32	32	2
11	28	362	310	572	44	36	15
13	36	354	314	604	40	40	22
15	48	253	211	684	32	32	2
17	140	362	302	600	161	36	128
19	56	358	282	417	66	48	32
21	56	334	278	444	225	52	158
23	68	294	254	456	103	64	35
25	48	374	286	576	36	32	0
27	68	322	213	816	44	36	0
29	72	314	203	508	44	40	0
31	24	330	282	372	80	44	0
August 1978							
2	44	337	316	472	64	32	15
4	8	249	233	724	40	36	0
6	24	262	229	520	60	48	5
8	80	302	237	460	96	52	48
10	16	294	254	484	--	52	--
12	40	322	286	488	32	32	42
14	12	314	282	656	193	12	102
16	4	334	282	336	92	72	60
18	36	496	258	396	56	48	15
20	0	306	285	540	52	48	8
22	56	657	516	580	44	34	2
24	48	415	326	784	--	--	5
26	40	342	250	720	44	32	0
28	48	332	240	984	64	24	5
30	72	320	244	888	56	52	28

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EPA-287 (Cin.)
(4-76)

TABLE A-61 (continued)

Date	Feed			MLSS	Effluent COD		Effluent Solids
	SS	COD					
		TOT	FIL		TOT	FIL	
September 1978							
1	52	324	252	688	156	44	90
3	28	316	256	636	44	40	0
5	72	388	344	828	60	24	18
7	36	366	220	756	36	36	0
9	76	375	294	764	40	24	25
11	72	342	274	888	32	28	5
13	40	342	274	1048	32	32	8
15	28	294	245	900	32	32	12
17	20	334	286	988	36	20	0
19	0	272	212	704	40	28	15
21	52	368	252	696	36	36	10
23	32	320	260	456	140	48	100
25	52	360	348	924	48	44	15
27	48	352	308	672	56	52	5
29	32	392	312	732	56	52	0
October 1978							
1	32	316	236	932	56	40	0
3	40	396	352	856	44	28	0
5	36	320	280	888	52	24	5
7	60	364	292	896	40	36	8
9	36	368	320	828	28	20	0
11	0	328	292	568	52	44	8
13	28	240	220	600	212	32	128
15	64	304	236	516	120	52	140
17	40	348	296	444	56	52	5
19	48	--	--	636	--	--	0
21	48	296	260	740	56	36	8
23	40	276	216	572	52	44	5
25	24	332	240	740	--	44	0
27	32	309	280	724	23	19	2
29	--	371	241	516	190	36	210
31	40	316	272	472	165	84	82

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EPA-287 (Cin.)
(4-76)

TABLE A-61 (continued)

Date	Feed			MLSS	Effluent COD		Effluent Solids
	SS	COD TOT	COD FIL		TOT	FIL	
November 1978							
2	84	325	320	672	39	31	8
4	48	296	241	744	35	--	2
6	60	328	260	784	43	31	10
8	28	375	275	888	55	19	0
10	84	316	249	704	51	47	8
12	8	264	154	928	47	47	0
14	52	308	304	936	39	35	8
16	48	245	229	976	35	31	2
18	88	379	300	912	24	12	5
20	64	353	252	892	36	24	10
22	24	247	223	808	28	20	10
24	80	341	247	1132	12	12	44
26	16	406	329	968	28	20	5
28	104	418	284	1044	40	24	5
30	52	333	247	1084	24	12	28
December 1978							
2	20	329	219	696	162	44	100
4	52	353	264	760	20	20	2
6	52	361	260	768	138	24	100
8	40	326	241	564	52	48	15
10	52	302	--	412	72	68	32
12	16	528	334	524	80	72	12
14	64	362	266	724	141	68	32
16	84	427	310	700	80	76	10
18	44	286	221	816	72	72	2
20	68	403	286	864	72	64	0
22	36	368	271	720	--	48	0
24	28	291	259	848	56	56	75
26	20	295	243	912	60	60	0
28	20	315	255	1136	44	40	0
30	12	277	269	928	60	56	0

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3/8"

PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-61 (continued)

Date	Feed SS	Feed COD TOT	Feed COD FIL	MLSS	Effluent COD TOT	Effluent COD FIL	Effluent Solids
January 1979							
1	64	309	261	852	64	60	2
2	80	309	261	1020	80	56	8
5	48	360	298	1012	48	40	8
7	52	558	233	1172	52	52	0
9	16	313	216	1136	16	12	0
11	16	281	241	1240	16	12	25
13	16	337	261	1116	16	12	28
15	44	237	--	840	44	24	10
17	96	415	318	804	68	48	8
19	108	334	318	1032	44	28	28
21	56	383	245	884	60	36	40
23	264	387	278	836	48	44	0
25	84	500	342	884	40	36	2
27	48	334	193	1188	32	20	2
29	44	258	145	1032	72	44	25
31	104	415	229	1004	32	28	10
February							
2	116	399	298	940	56	52	5
4	4	475	294	928	64	24	0
6	48	281	266	748	81	34	0
8	36	339	216	768	61	34	5
10	15	332	258	664	61	54	0
12	64	324	247	752	61	42	0
14	68	343	247	956	38	30	0
16	60	370	336	872	34	27	18
18	96	374	227	980	23	19	10
20	--	--	--	--	--	--	--
22	36	343	231	1064	34	23	40
24	40	384	380	1020	48	28	0
26	100	420	324	1156	32	20	0
28	32	276	240	1084	36	24	0

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3/8"
PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-61 (continued)

Date	Feed			MLSS	Effluent COD		Effluent Solids
	SS	COD					
		TOT	FIL		TOT	FIL	
March 1979							
2	80	332	264	1028	32	20	0
4	76	336	268	884	64	40	0
6	40	384	360	824	52	16	62
8	72	412	288	748	52	44	2
10	80	412	348	720	64	28	0
12	56	360	280	732	40	40	0
14	72	384	284	788	76	40	20
16	60	680	340	900	44	24	12
18	124	598	377	752	116	116	20
20	84	437	357	768	76	40	2
22	0	--	--	852	36	36	0
24	108	518	397	954	60	48	8
26	40	397	345	708	116	52	112
28	40	534	437	344	108	96	0
30	48	--	357	240	116	48	25
April 1979							
1	16	337	236	292	100	96	0
3	8	396	304	308	80	64	12
5	44	436	360	460	88	60	2
7	0	352	320	700	68	68	0
9	24	396	312	656	40	40	0
11	48	340	260	880	44	40	0
13	40	248	240	684	40	40	0
15	20	333	265	768	36	24	2
17	72	309	225	708	36	24	12
19	32	322	274	708	48	44	0
21	16	361	315	540	66	54	0
23	24	322	280	1088	62	58	0

EPA-287 (Cin.)
(4-76)

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TABLE A-62. DATA FOR BENZENE CONTINUOUS FLOW REACTOR. θ_c = 5 days

Date	Feed			MLSS	Effluent COD		Effluent Solids
	pH	COD					
		TOT	FIL		TOT	FIL	
Sept. 1977							
5	7.62	255	184	1500	96	66	13
7	7.47	285				62	9
9	7.57	272	198	3214	98	59	2
11	7.45	283		2428		60	2
13	7.43	292	210	2320		61	4
15	7.46	301	222	2512		56	8
17	7.59	333	262	3251		26	2
19		306	227	3612		32	4
20	7.43	296	204	2788		37	18
21	7.30	311	207	2408	48	36	6
22	7.63	307	212	3304	36	20	2
23	7.74	319	216	2572	43	32	6
24	7.76	316	209	2642	38	24	3
25	7.72	311	219	3212	35	16	12
26		309	206	2816	39	26	2
27	7.62	376	252	2952	32	15	6
28	7.54	316	218	3280	24	16	0
30	7.52	328	212	2512	31	20	2
Oct. 1977							
1		352	234	2164	26	15	2
2	7.58	376	262	2032	68	50	2
4	7.54	379	342	1862	36	26	12
6	7.63	431	276	1969	51	38	8
7	7.52	395	281	3100	56	34	22
9	7.58	378	264	2908	39	34	0
11	7.46	341	232	2184	31	24	2
13	7.35	392	284	2572	23	20	0
15	7.46	614	338	3084	48	28	18
16	7.58	424	287	2480	46	32	10
18	7.51	407	328	2596	47	36	6
20	7.63	439	342	3380	51	36	12
22	7.54	375	304	1824	63	32	46
23	7.66	347	292	2376	46	32	12
25	7.62	344	291	2009	34	32	0
27	7.59	379	304	2412	44	32	6
29	7.62	391	317	2692	49	28	16
31	7.52	345	301	1676	41	35	8

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BOTTOM OF IMAGE AREA; UTSIDE MENSION FOR TABLES AND ILLUSTRATIONS
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3/8"

PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-62 (Continued)

Date	Feed			MLSS	Effluent COD		Effluent Solids
	pH	COD					
		TOT	FIL		TOT	FIL	
Nov. 1977							
1	7.62	389	218	1844	37	31	8
3	7.66	372	331	1923	36	28	12
5	7.69	364	306	1472	32	27	2
7	7.65	364	303	1642	39	34	8
9		389	331	1788	33	22	16
11	7.8	321	279	2248	36	18	16
13	7.55	361	304	3596	26	21	2
15	7.85	413	339	1936	57	46	12
17	7.53	357	282	1952	67	57	9
19	7.63	337	289	2104	67	60	14
20	7.47	361	306	2144	39	32	6
22	7.67	401	341	2156	59	48	8
24	7.63	498	386	2644	46	36	6
26	7.78	381	321	1636	48	40	12
27	7.54	414	331	1842	52	40	10
29	7.48	378	322	1908	41	30	12
Dec. 1977							
1	7.56	386	332	1908	44	34	0
3	7.47	430	386	2264	90	78	158
4	7.59	434	379	1844	56	42	14
6	7.67	391	342	2232	74	66	6
8	7.53	372	327	2296	48	39	2
10	7.7	348	304	2396	38	35	2
11	7.41	378	343	3604	44	39	4
16			405	2462		45	12
17			397	2572		20	5
18			615	2814		101	13
21			405	2552		57	8
22			413	3272		41	2
23			507	2842		61	9
27			429	2649		73	12
28			389	2712		66	6
29			520	2660		85	16

6-1/2"
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BOTTOM OF IMAGE AREA; OUTSIDE DIMENSION FOR TABLES AND ILLUSTRATIONS
3/8"

PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-63. DATA FOR PHENOL CONTINUOUS FLOW REACTOR. θ_c = 5 days

Date	Feed SS	Feed COD TOT	Feed COD FIL	MLSS	Effluent COD TOT	Effluent COD FIL	Effluent Solids
Sept. 1977							
7	30	194	154	710	61	57	0
8	26	162	130		69	62	0
9	16	294	270	680	65	61	0
10	30	318	280		65	62	0
11	28	309	276	660	57	51	
12	25	228	196		49	45	
13	20	232	210	720	36	30	
17	40	192	136	1705	40	36	0
18	36	332	280	2445	60	44	10
19	20	216	193	1800	36	32	0
20	35	396	350	1980	48	31	16
21	40	292	250	2100	36	16	20
22	44	240	196	1930	120	24	95
23	30	229	175	2415	40	29	10
24	40	412	368	2635	121	104	135
25	34	247	204	2162	86	49	40
26	65	185	119	2090	136	49	80
27	18	334	312	1643	169	25	120
29	15	279	260	1605	84	33	45
Oct. 1977							
1	20	341	310	1420	86	33	47
3	10	270	260	1360	133	35	110
5	20	314	290	1320	39	24	30
7	16	332	318	1140	40	36	5
9	16	252	236	1350	52	40	10
11	20	312	290	1430	72	36	30
13	24	268	242	1355	56	34	23
15	20	414	380	1308	84	52	12
17	50	232	198	1460	191	49	108
19	20	250	221	1530	49	45	0
21	22	256	225	1542	56	39	1
23	55	354	252	1410	35	35	0
25	50	382	306	1064	72	56	20
27	80	352	192	990	224	48	150
29	40	300	192	1345	48	32	9
31	38	236	160	908	76	52	14

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6-1/2
9-1/2"
BOTTOM OF IMAGE AREA; OUTSIDE DIMENSION FOR TABLES AND ILLUSTRATIONS
BEGIN LAST LINE OF TEXT
3/8"
PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-63. (Continued)

Date	Feed			MLSS	Effluent		Effluent Solids
	SS	COD			COD		
		TOT	FIL		TOT	FIL	
November 1977							
2	35	340	180	908	96	60	25
4	105	299	137	1155	135	36	83
6	13	238	202	803	133	57	43
8	85	416	279	852	109	53	40
10	37	249	198	885	143	44	39
12	27	242	202	1010	34	32	0
14	50	388	304	1105	76	44	8
16	47	492	372	1300	36	36	0
18	90	418	277	1330	39	39	0
20	90	451	324	1385	74	47	30
22	77	414	322	1090	60	43	18
24	70	415	312	1205	120	43	61
26	47	399	320	1180	116	47	52
28	40	340	281	1052	180	43	104
30	53	349	264	873	140	23	80
Dec. 1977							
2	100	488	333	1075	174	39	91
4	106	382	272	990	216	51	100
6	70	400	300	825	319	78	123
8	70	417	290	625	223	51	126
10	80	443	294	615	282	51	159
12	63	409	325	485	325	67	101
17	60	456	361	455	246	139	75
18	70	520	381	600	234	119	30
23	23	414	382	858	228	55	61
24	20	362	340	790	260	83	93
29	50	262	245	677	176	47	81
30	25	313	300	685	180	47	60

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BOTTOM OF IMAGE AREA; OUTSIDE DIMENSION FOR TABLES AND ILLUSTRATIONS
3/8"
PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TYPING GUIDE SHEET
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TABLE A-64. DATA FOR PHENOL CONTINUOUS FLOW REACTOR EXTENDED AERATION

Date	Feed pH	Feed COD TOT	Feed COD FIL	MLSS	Effluent COD TOT	Effluent COD FIL	Effluent Solids SS
Sept. 1978							
4				200			
5				220			
6				380			
7				420			
8				500	100	80	
9				520	110	84	
10				580	96	80	
11				600	90	70	
12				608	80	76	
13				620	84	72	
14	7.4			628	76	70	
15	7.6			650	78	72	10
16	7.7			700	82	76	10
17	7.75			1700	72	64	15
18	7.75	252		1728			25
19	7.75			1750			10
20	7.75			1800			20
21	7.75			1648			15
23		324		1680	50	10	40
24		336		1640	68	10	48
25		344		1440	60	10	52
26		332		1280	70	20	56
27		324		1040	64	12	60
28		336		960	56	20	40
29		350		860	40	12	36
30		328		1060	44	16	40
October 1978							
2	7.3	318		1220	50	20	28
3	7.3	328		1240	44	36	36
4	7.4	342		1160	44	32	32
5		336		1200	40	28	40
6	7.3	324		1220	24	20	44
7	7.3	332		1240	28	20	40
8	7.75	330		1280	24	16	36
9	7.7	324		1320	24	12	32
10	7.75	460		1360	48	35	36
11	7.7	520		1420	51	40	48
12	7.44	380		1480	72	30	36
13	7.4	432		1560	40	36	52

(continued)

PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-64 (Continued)

Date	Feed			MLSS	Effluent COD		Effluent Solids	
	pH	COD	FIL		COD	FIL		SS
October 1978 (continued)								
14	7.56	582		1620	72	52	48	
15	7.52	464		1680	76	48	72	
16	7.54	432		1792	76	52	80	
18	7.4	596		1680	80	40	28	
19	7.4	396		1640	80		36	
20	7.4	376		1568	104	72	32	
21	7.4	396		1756	64	44	40	
22	7.4	416		1776	68	40	8	
23	7.4	356		1774	44	40	8	48
24	7.2			1720			40	
25	7.0	320		1620	62	45	16	
26	7.0	312		1704	45	41	8	
27	7.0	406		1828	49	41	24	
28	7.2	344		1820	74	70	32	
29	7.2	394		1860	53	37	44	
30	7.25	361		1916		62	36	
November 1978								
1	7.35	380		1720	68	36	40	
2	7.35	328		1588	44	36	44	
3	7.14	440		1908	64	48	16	
4	7.0	364		1840	112	48	40	
5	7.0	360		1736	96	40	76	
6	7.0	356		1456	44	44	8	
8	7.2	360		1752	40	36	8	
9	7.2	364		1728	48	44	16	
10	7.2	380		2020	52	48	12	
11	7.2	396		1980	56	48	36	
12		384		1976	52	44	28	
13		376		1768	56	52	36	
15	7.24	396		1820	48	44	8	
16		380		1796	48	48	12	
17		360		1560	52	48	16	
18		376		1520	48	40	20	
19	7.21	384		1320	48	36	16	
20	7.62	372		1396	44	40	20	36
21	7.65	426		1240	49	41	16	
22	7.72	410		1320	41	37	8	
23	7.75	379		1024	53	37	24	
24	7.72	390		1120	41	33	20	

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6-1/2"
9-1/8"

PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-64. (Continued)

Date	pH	Feed COD TOT	Feed COD FIL	MLSS	Effluent COD TOT	Effluent COD FIL	Effluent Solids	SS
November 1978 (continued)								
24	7.72	390		1120	41	33	20	
25	7.72	426		1240	53	49	12	
26	7.73	373		1324	61	57	16	
27		365		1420	57	45	32	
29		444		1428	44	40	48	
30	7.72	316		----	36	36	--	
December 1978								
1				1512			4	45
3		376		1320	56	36	20	75
6		426	307	2035	49	41	5	68
8		442	279	2460	53	37	30	45
10		492	410	1874	41	37	58	48
13		407	231	2096	42	38	48	56
15		412	260	1920	155	54	48	44
17		374	307	2012	80	55	24	60
20	7.72	407	296	2412	86	66	65	48
22	7.7	396	281	2392	97	76	80	56
24	7.7	409	272	2518	83	62	70	44
25		407	260	2312	--	62	55	50
26		374	307	2418		76	60	50
27		396		2310			60	45
28		409	272	2424		86	65	45
29		412	260	2480		83	70	50
30		409	281	2380		80	65	55
31		374	231	2426		66	60	45
January								
1	7.62	396	281	2340	281	76	65	55
2		409	272	2618	---	83	70	50
3		407	296	2324	---	80	70	55
4		396	281	2520	---	76	75	45
5	7.72	400	272	2416	---	76	75	45
7		---	---	2380	---	--	65	50
9		---	---	2460	---	--	60	50

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3/8"

PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-65. DATA FOR NITROBENZENE CONTINUOUS FLOW REACTOR. θ_c = 5 days

Date	Feed			MLSS	Effluent COD		Effluent Solids
	pH	COD TOT	COD FIL		TOT	FIL	
January 1978							
16	7.43	461	315	2054	196	154	84
18	7.64			2251	189	130	90
19	7.71	369	279	2121	137	94	40
21	7.52	385	281	2300	86	53	30
23	7.68	424	343	2392	64	44	26
24	7.54	342	276	2432	278	255	21
25	7.63	389	302	2462	149	140	22
26	7.58	468	357	2342	132	110	18
27	7.52	413	343	2532	78	63	20
28	7.73	401	305	2864	80	67	20
30	7.78	389	297	2951	40	32	15
February 1978							
1	7.66	369	245	3440	33	28	8
3	7.52	290	232	3520	219	194	16
4	7.63	371	293	3124	120	119	8
6	7.58	392	299	3352	46	41	8
8	7.54	364	278	3164	41	37	6
10	7.73	434	313	3240	32	32	2
12	7.61	434	336	2972	39	37	4
14	7.58	468	347	3450	40	40	2
16	7.59	428	302	3248	62	52	4
17	7.68	392	252	3344	41	40	6
19	7.56	428	342	3587	71	72	0
20	7.67	389	306	3244	62	60	6
21	7.72	399	304	3152	51	48	8
22	7.64	406	329	3289	58	56	6
23	7.56	379	298	2508	64	60	6
24	7.72	407	315	3341	44	40	4
25	7.58	391	318	3422	47	44	8
27	7.64	449	325	3143	42	26	6

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BOTTOM OF IMAGE AREA; OUTSIDE DIMENSION FOR TABLES AND ILLUSTRATIONS
3/8"
PAGE NUMBER

EPA-287 (Cin.)
(4-76)

TABLE A-65 (Continued)

Date	Feed			MLSS	Effluent COD		Effluent Solids
	pH	COD TOT	COD FIL		TOT	FIL	
March 1978							
1	7.54	417	313	3368	46	28	9
3	7.73	389	289	3428	69	49	28
5	7.62	506	363	3512	48	26	22
7	7.72	416	299	3652	65	43	20
9	7.66	423	307	3146	68	44	24
11	7.60	413	290	3206	61	39	20
13	7.58	435	313	2912	62	43	12
15	7.67	456	336	2446	61	52	4
17	7.72	403	296	2682	46	28	8
19	7.62	386	286	2856	48	38	6
21	7.58	464	329	2872	42	32	8
23	7.74	443	303	2391	363	300	42
25	7.68	496	340	2212	142	116	30
27	7.54	399	287	2396	117	96	16
29	7.58	444	315	2560	38	31	2
31	7.68	420	294	2264	78	66	14
April 1978							
2	7.56	409	286	2548	46	31	8
4	7.66	410	307	2040	48	39	4
6	7.83	391	333	2068	43	46	0
8	7.74	397	299	1920	56	50	2
10	7.7	376	289	1588	52	44	0
12	7.63	399	304	1856	38	24	4
14	7.67	416	353	1708	33	20	6
16	7.74	466	356	1760	29	20	2
18	7.56	448	389	1712	42	36	4
20	7.54	456	406	1722	29	26	0
22	7.62	467	392	1616	36	24	4
24	7.57	376	302	1604	33	24	4
26	7.73	408	379	1552	32	28	0
28	7.62	424	366	1572	44	32	4
30	7.78	436	344	1508	52	36	8

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BOTTOM OF IMAGE AREA: OUTSIDE DIMENSION FOR TABLES AND ILLUSTRATIONS
BEGIN LAST LINE OF TEXT
3/8"
PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-65. (Continued)

Date	Feed			MLSS	Effluent COD		Effluent Solids
	pH	COD TOT	COD FIL		TOT	FIL	
May 1978							
2	7.7	421	334	1486	44	36	4
3	7.58	412	347	1214	78	36	38
4	7.66	428	356	1118	86	44	42
5	7.62	406	339	1056	69	38	28
6	7.58	464	362	1032	85	32	38
7	7.56	416	329	872	159	56	72
8	7.67	374	336	792	141	61	62
9	7.63	391	326	762	179	56	130
10	7.72	429	395	712	165	52	68
11	7.64	416	309	672	148	36	132
12	7.68	403	368	656	130	40	49
13	7.56	386	342	688	140	36	152
14	7.72	496	436	624	276	32	234
15	7.52	406	346	646	36	38	86
16	7.62	448	402	692	42	35	16
17	7.73	436	350	623	119	41	36
18	7.66	416	348	594	151	42	72
19	7.60	386	328	588	86	38	44
20	7.56	413	322	512	106	40	92
21	6.74	306	242	586	168	62	73
22	7.45	286	268	608	36	32	2
23	7.64	352	296	656	58	39	16
24	7.54	457	359	522	146	44	122
25	7.64	303	256	592	99	40	38
26	7.56	357	246	676	98	36	58
27	7.71	332	262	696	44	32	10
28	7.58	278	261	638	78	36	28
29	7.48	306	257	644	156	38	112
30	7.50	368	272	576	146	45	106
31	7.68	448	250	562	86	47	58
June 1978							
1	7.63	338	256	532	122	45	64
2	7.73	307	238	520	98	38	20
3	7.58	295	248	568	86	39	64
4	7.67	392	341	624	93	45	88
5	7.61	372	307	528	88	53	84
6	7.58	323	240	494	64	36	56
7	7.72	293	272	484	113	38	60
8	7.56	328	236	542	48	40	38

(continued)

EPA-287 (Cin.)
(4-76)

TABLE A-65. (Continued)

Date	Feed			MLSS	Effluent COD		Effluent Solids
	pH	COD TOT	COD FIL		TOT	FIL	
June 1978 (continued)							
9	7.70	229	224	564	43	30	4
10	7.54	348	273	592	128	35	98
11	7.58	335	256	652	80	32	52
12	7.66	342	279	676	72	36	32
13	7.52	348	298	696	59	34	20
14	7.67	318	281	706	52	31	16
15	7.62	389	277	724	38	30	10

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3/8"

EPA-287 (Cin.)
(4-76)

TABLE A-66. DATA FOR 2-CHLOROPHENOL CONTINUOUS FLOW REACTOR. θ_c = 5 DAYS

Date	Feed			MLSS	Effluent		Effluent Solids
	SS	COD			COD		
		TOT	FIL		TOT	FIL	
January 1978							
10	40	261	220	875	36	26	5
11	235	478	238	1170	40	36	4
13	30	263	230	1138	36	32	9
14	35	324	257	1123	61	43	23
16	20	328	248	1325	140	48	71
17	45	333	240	1092	258	47	116
19	35	376	308	1675	260	209	13
21	44	349	262	1530	266	62	145
23	67	335	283	1220	143	47	71
27				1610	132	62	60
28	96	341	244	1645	78	58	22
29	96	360	279	1220	229	70	57
31	37	368	284	1762	196	98	80
February 1978							
2	50	280	220	1400	133	92	50
4	30	284	212	1332	202	80	84
6	50	312	231	1227	126	25	70
8	60	324	244	1330	99	29	60
10	26	266	220	1105	130	29	84
12	75	316	228	1015	102	44	48
14	40	208	168	835	136	44	46
16	10	204	204	732	240	40	103
18	0	222	220	817	126	48	58
20	75	330	234	807	136	30	75
22	57	420	298	1640	88	38	23
24	35	346	276	1860	80	72	8
26	15	250	215	1350	70	14	50
28	55	280	218	1160	14	4	10

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3/8"
PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-66 (continued)

Date	Feed SS	Feed COD TOT	Feed COD FIL	MLSS	Effluent COD TOT	Effluent COD FIL	Effluent Solids
March 1978							
2	10	289	279	1450	50	10	5
4	35	283	240	1020	120	45	108
6	5	286	280	1045	151	47	98
8	30	285	241	825	136	53	79
10	24	303	276	1400	82	41	36
12	50	327	280	1275	57	28	26
14	43	307	260	1277	126	24	91
16	7	250	242	1040	72	44	23
18	30	332	292	1100	198	84	102
20	66	323	256	1210	115	44	62
22	65	372	306	1150	87	48	34
24	43	778	720	1838	225	190	26
26	33	360	320	1557	90	44	38
28	23	360	330	1310	40	13	60
31	56	426	360	1257	36	0	36
April 1978							
2	30	348	316	1550	40	5	44
4	70	398	296	1030	370	40	236
6	20	370	344	840	236	44	138
8	66	390	296	725	212	80	109
10	66	364	286	735	152	80	55
12	55	370	302	975	126	98	23
14	37	392	350	1157	70	64	5
16	120	454	348	1535	40	34	8
18	30	422	396	1212	206	40	145
20	15	436	416	955	238	36	178
22	80	492	408	972	172	34	124
24	50	396	322	967	208	48	109
26	7	420	410	1105	144	46	62
28	30	432	390	1805	128	46	78
30	71	394	320	1230	120	34	77

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3/8"
PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-66 (continued)

Date	Feed			MLSS	Effluent COD		Effluent Solids
	SS	COD					
		TOT	FIL		TOT	FIL	
May 1978							
2	90	414	334	1272	138	34	80
3	57	382	330	1377	110	40	66
4	77	406	342	1405	102	38	51
5	50	380	326	1410	94	38	48
6	102	456	352	1062	104	36	63
7	70	384	304	1215	100	48	42
8	17	364	344	1277	264	40	74
9	60	360	290	1030	180	46	89
10	37	400	392	855	164	40	93
11	103	412	304	965	136	72	100
12	23	404	380	903	164	40	94
13	50	360	330	1130	176	76	72
14	40	470	428	1240	198	56	118
15	40	376	326	1367	124	60	66
16	47	456	396	1428	80	46	49
17	70	420	340	1325	98	36	148
18	83	422	336	1105	168	30	127
19	77	398	318	1020	80	36	47
20	77	392	308	1120	92	36	72
21	120	270	220	1210	242	92	111
22	0	260	256	900	126	36	75
23	97	368	284	1195	140	40	82
24	133	502	376	952	170	62	84
25	27	316	244	844	166	40	75
26	63	330	232	940	88	32	56
27	60	316	252	1042	124	32	100
28	10	258	244	1020	92	36	54
29	43	270	230	1010	94	34	55
30	70	346	258	922	102	38	48
31	237	422	222	874	82	34	100

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3/8"

EPA-287 (Cin.)
(4-76)

TABLE A-66 (continued)

Date	Feed			MLSS	Effluent		Effluent Solids
	SS	COD			COD		
		TOT	FIL		TOT	FIL	
June 1978							
1	70	302	224	930	72	26	59
2	57	270	220	945	66	38	31
3	43	302	254	915	78	40	55
4	60	410	350	1310	74	42	46
5	63	348	272	1282	40	36	5
6	67	304	232	1092	44	32	25
7	30	280	250	1077	104	36	51
8	60	344	244	1000	52	44	24
9	0	204	204	662	164	20	89
10	53	332	266	1140	110	56	56
11	60	342	270	985	44	32	10
12	67	356	272	920	120	40	68
13	50	356	300	698	256	46	155
14	63	328	292	867	92	50	84
15	123	416	280	720	36	36	0
16	57	348	280	900	112	52	98

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3/8"

PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-67. DATA FOR 2-CHLOROPHENOL CONTINUOUS FLOW REACTOR EXTENDED AERATION

Date	Feed			MLSS	Effluent COD		Effluent Solids
	SS	COD TOT	COD FIL		TOT	FIL	
January 1978							
15	45	400	252	2424	68	56	60
17	55	596	458	2340	72	52	65
19	50	392	268	2618	76	64	70
21	55	398	265	2324	64	45	70
23	45	502	352	2520	56	40	75
25	35	414	158	2420	50	35	45
27	30	398	214	2320	45	30	40
29	30	373	198	2480	49	44	35
31	40	377	202	2280	70	57	25
February 1978							
2	35	415	296	2340	82	53	20
4	45	377	212	2260	53	49	25
6	40	441	281	2320	72	67	20
8	35	490	293	2180	68	59	20
10	30	373	285	2060	55	49	15
12	35			2010			10
14	40			1820			10
16	30	396	251	1860	72	59	15
18	35	376	231	1910	68	56	15
20	35	380	240	1840	60	56	10
22	35	396	252	1520	56	48	25
24	40	412	296	1480	60	52	20
26	30	376	212	1560	52	48	25
28	35	322	296	1680	52	30	20

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3/8"
PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-67 (continued)

Date	Feed SS	Feed COD TOT	Feed COD FIL	MLSS	Effluent COD TOT	Effluent COD FIL	Effluent Solids
March 1978							
2	40	391	301	1620	69	39	30
4	35	327	288	1660	60	34	30
6	30	412	296	1620	50	30	25
8	35	376	240	1500	48	32	20
10	30	380	252	1480	52	30	25
12	35	396	212	1490	50	30	30
14	45	380	268	1520	48	25	20
16	40	376	232	1540	40	30	15
18	30	382	276	1580	38	32	20
20	35	386	248	1520	36	28	15
22	40	396	268	1530	42	32	20
24	30	378	256	1500	36	28	15
26	35	382	232	1520	38	30	15
28	40	401	276	1560	58	50	20
30	30	394	268	1620	55	47	25
April 1978							
1	35	386	252	1680	35	31	20
3	65	404	332	1600	40	40	45
5	40	408	342	1580	64	48	45
7	60	396	304	1460	68	56	55
9	65	412	336	1420	44	40	70
12	55	404	340	1380	64	56	40
14	25	412	332	1340	60	48	60
16	40	456	356	1280	80	40	55
18	50	432	396	1320	68	48	25
20	40	456	396	1280	72	56	20
22	45	476	408	1360	60	40	65
24	45	404	322	1380	48	32	35
26	35	424	340	1360	48	36	30
28	30	436	312	1400	72	60	30
30	65	412	300	1380	72	56	25

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3/8"
PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-67 (continued)

Date	Feed SS	Feed COD TOT	Feed COD FIL	MLSS	Effluent COD TOT	Effluent COD FIL	Effluent Solids
June 1978							
1	55	300	218	1580	40	32	15
2	40	324	292	1610	48	36	15
3	65	412	332	1640	44	36	15
4	65	364	284	1620	36	28	10
5	60	312	256	1660	28	24	15
6	35	304	280	1720	32	28	15
7	55	348	240	1740	32	26	10
8	0	272	212	1760	40	32	15
9	55	322	248	1800	36	32	10
10	60	356	212	1820	42	36	15
11	65	376	280	1840	32	24	15
12	55	376	296	1830	36	28	10
13	60	332	280	1920	32	24	15
14	90	452	360	1940	36	28	10
15	25	420	348	1720	36	32	10

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3/8"

PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-67 (continued)

Date	Feed SS	Feed COD TOT	Feed COD FIL	MLSS	Effluent COD TOT	Effluent COD FIL	Effluent Solids
May 1978							
2	60	424	342	1380	64	52	35
4	50	404	324	1420	68	52	25
5	45	426	352	1460	56	48	20
6	65	412	304	1360	64	48	20
7	20	348	312	1340	48	40	15
8	60	396	290	1340	42	36	15
9	40	380	312	1360	52	44	15
10	80	348	304	1340	48	40	20
11	25	384	280	1380	44	36	15
12	45	402	312	1420	52	48	10
13	45	448	408	1440	48	40	15
14	40	412	320	1400	44	40	15
15	45	464	380	1420	44	36	15
16	65	480	340	1380	52	48	10
17	80	440	324	1360	52	44	15
18	70	396	312	1320	44	36	10
19	65	412	304	1280	44	40	10
20	85	284	260	1260	40	36	15
21	65	304	278	1380	48	44	15
22	90	364	288	1380	52	40	10
23	120	512	418	1420	48	40	10
24	30	332	252	1380	44	36	10
25	60	364	312	1340	52	44	15
26	55	324	282	1420	48	40	15
27	15	296	276	1460	44	36	20
28	45	304	280	1480	40	32	10
29	65	364	312	1520	36	32	20
30	120	420	296	1540	44	36	20
31	130	324	242	1480	44	36	10

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3/8"

PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-68. DATA FOR TRICHLOROETHYLENE CONTINUOUS FLOW REACTOR. θ_c = 5 DAYS

Date	Feed			MLSS	Effluent COD		Effluent Solids
	SS	COD TOT	COD FIL		TOT	FIL	
July 1978							
26		335	256	732	53	43	16
28		339	279	694	50	39	14
30		310	--	676	--	35	12
August 1978							
1		342	272	668	95	73	16
2		315	262	628	104	78	28
3		294	226	544	129	66	64
5		272	226	476	99	48	42
7		320	268	392	89	38	48
9		291	221	476	168	139	26
11		316	276	553	46	39	4
17	90	566	504	430	68	40	33
19	57	480	332	860	71	22	55
21	37	321	296	940	30	26	0
23	67	705	508	830	103	67	23
25	80	305	247	900	222	54	165
27	30	334	313	635	29	29	0
29	87	792	228	1115	40	40	15
September 1978							
1	80	364	280	715	128	40	60
3	30	332	292	625	78	28	26
5	45	542	340	810	82	42	36
7	88	480	362	925	84	48	40
9	48	440	332	825	72	52	48
11	92	412	312	710	96	42	55
13	80	400	302	970	120	46	80
15	64	364	296	1102	102	36	48
17	60	364	322	872	78	40	52
19	45	372	320	635	86	48	42
21	52	462	380	840	152	36	40
23	48	320	228	1072	38	28	24
25	42	300	216	986	48	36	16
27	44	280	204	1056	48	32	20
29	40	340	260	1066	50	36	30

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BOTTOM OF IMAGE AREA; OUTSIDE DIMENSION FOR TABLES AND ILLUSTRATIONS
PAGE NUMBER
EPA-267 (Cin.)
(4-76)

TABLE A-68 (continued)

Date	Feed			MLSS	Effluent		Effluent Solids
	SS	COD			COD		
		TOT	FIL		TOT	FIL	
October 1978							
1	44	312	224	1120	38	24	26
3	40	294	228	1020	44	32	24
5	72	314	272	1120	52	40	26
7	72	384	296	780	52	32	36
9	84	296	236	840	42	24	20
11	90	364	248	950	48	32	24
13	80	312	224	960	68	40	36
15	62	376	264	1020	72	42	40
17	60	384	284	820	64	36	36
19	56	412	308	960	48	32	28
21	72	400	296	1020	52	28	32
23	76	396	284	980	58	30	32
25	80	432	320	860	64	36	36
27	64	412	320	1020	50	32	22
29	64	396	282	1080	64	32	36
31	80	384	296	1060	46	28	20
November 1978							
2	44	384	264	980	56	32	30
4	48	372	262	1120	52	36	24
6	40	372	248	860	48	32	22
8	50	348	224	1080	48	32	20
10	36	364	272	1032	36	26	16
12	55	357	262	1400	29	33	0
14	45	372	297	1000	57	25	23
16	22	276	252	730	412	28	260
18	70	344	224	430	192	44	110
19	58	345	226	405	147	48	130
22	88	425	278	855	139	48	82
23	68	389	278	890	107	48	60
26	30	300	224	815	189	42	105
27	--	227	216	760	220	36	145

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3/8"

EPA-287 (Cin.)
(4-76)

TABLE A-68 (continued)

Date	Feed SS	Feed COD TOT	Feed COD FIL	MLSS	Effluent COD TOT	Effluent COD FIL	Effluent Solids
December 1978							
1	26	352	250	445	208	86	85
4	70	379	270	605	216	61	110
5	68	358	249	595	221	55	160
8	78	387	273	615	200	52	95
9	155	508	283	735	152	44	70
12	125	484	308	1200	268	72	155
13	70	384	276	1270	200	60	100
16	135	416	308	890	180	68	100
17	85	472	328	1010	208	48	85
19	50	466	336	1315	416	76	215
22	70	336	256	585	--	72	60

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3/8"

PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-69 (continued)

Date	Feed			MLSS	Effluent COD		Effluent Solids
	SS	COD					
		TOT	FIL		TOT	FIL	
October 1978							
2	83	368	272	970	180	28	122
4	60	408	324	1170	132	40	77
6	87	456	340	930	196	28	115
8	83	384	306	1130	120	56	72
10	87	312	264	725	148	36	82
12	100	364	268	835	100	40	48
14	80	384	308	780	96	32	53
16	63	366	260	865	82	24	48
18	70	360	276	562	180	36	112
20	60	402	332	580	140	40	65
22	80	404	288	775	124	46	78
24	90	412	312	635	162	69	83
26	90	440	324	800	212	54	150
28	77	425	328	440	193	62	88
30	80	421	328	535	411	85	220
November 1978							
1	80	405	305	755	39	35	3
3	102	464	324	625	334	56	198
5	83	460	320	585	152	48	128
7	180	432	308	660	148	24	115
9	60	380	272	455	180	52	120
11	77	436	348	850	164	52	63
13	43	412	320	450	204	56	85
15	112	460	300	470	176	40	125
16	87	400	310	530	216	36	158
19	93	394	296	460	200	44	108
20	47	380	300	660	160	63	83
23	113	471	326	460	213	58	158
24	83	489	351	515	226	63	113
27	10	263	253	505	124	72	75
28	47	364	308	295	240	44	167

(continued)

TABLE A-69 (continued)

Date	Feed			MLSS	Effluent COD		Effluent Solids
	SS	COD					
		TOT	FIL		TOT	FIL	
December 1978							
1	133	416	348	625	180	76	78
2	93	420	356	770	144	64	75
5	73	380	310	785	104	80	48
6	70	424	352	890	160	44	63
9	72	416	324	905	172	24	95
10	100	532	372	1110	192	56	104
13	210	584	296	830	182	76	83
14	68	428	376	905	140	88	53
17	80	444	372	1455	196	48	120
20	95	510	376	1450	126	44	40
23	75	414	276	1770	100	54	55

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3/8"
PAGE NUMBER
EPA-287 (Cin.)
(4-79)

TABLE A-70. DATA FOR METHYLENE CHLORIDE CONTINUOUS FLOW REACTOR EXTENDED AERATION

Date	Feed SS	Feed COD TOT	Feed COD FIL	MLSS	Effluent COD TOT	Effluent COD FIL	Effluent Solids
June 1978							
17	--	350	290	1800	36	24	15
19	24	402	312	1820	40	28	20
21	40	352	286	1840	42	30	20
23	28	--	502	1820	38	26	15
25	36	432	362	1860	40	28	24
27	24	452	386	1920	52	40	30
29	36	332	296	1900	44	36	28
July 1978							
1	36	380	292	1940	38	32	24
3	36	312	262	1860	42	36	20
5	28	380	284	1920	40	32	24
7	12	352	296	2040	42	32	26
9	40	332	264	2060	46	36	28
11	28	362	280	1980	56	46	32
13	36	360	268	2040	62	52	40
15	80	312	240	1960	60	48	36
17	120	372	284	2020	48	36	32
19	56	362	272	1980	36	30	24
21	60	348	252	2000	40	32	20
23	72	300	212	2040	38	28	15
25	50	312	220	2060	40	26	20
27	72	352	264	2080	42	30	24
29	48	324	236	2100	48	32	26
31	32	362	268	2060	44	30	22
August 1978							
2	32	312	250	1960	38	26	24
4	116	324	272	1980	40	32	26
6	80	320	260	2020	36	26	22
8	68	308	240	1980	36	24	20
10	32	300	252	1960	36	20	16
12	120	468	320	1900	40	24	20
16	32	350	310	1920	36	20	18
18	76	372	308	1920	30	15	20
20	68	380	312	1940	32	25	22
22	80	640	520	1960	32	20	16

(continued)

PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-70 (continued)

Date	Feed			MLSS	Effluent		Effluent Solids
	SS	COD			COD		
		TOT	FIL		TOT	FIL	
August 1978 (continued)							
24	72	372	312	1920	28	15	10
26	64	412	324	1940	30	19	16
28	48	340	272	1960	32	20	16
30	36	382	360	1980	36	24	20
September 1978							
1	96	348	280	1920	28	15	12
3	36	342	296	1940	30	20	16
5	68	552	348	1960	32	20	20
7	90	464	396	1900	38	32	24
9	72	452	342	2120	42	35	20
11	88	402	310	2160	44	38	16
13	76	412	302	2240	48	34	20
15	60	396	312	2280	44	32	16
17	62	380	324	2300	40	28	18
19	52	372	324	2260	42	35	12
21	45	472	384	2280	38	30	14
23	44	364	286	2220	38	26	20
25	48	372	284	2080	36	28	16
27	52	340	248	2320	48	30	24
29	36	368	272	2260	46	32	26
October 1978							
1	44	396	312	2260	38	28	20
3	36	412	324	2380	40	34	26
5	80	436	296	2420	42	30	22
7	75	396	302	2520	52	32	24
9	80	300	254	2320	50	34	22
11	96	376	276	2120	32	12	16
13	84	372	300	2140	30	16	10
15	64	380	274	2080	26	20	12
17	60	376	296	2000	28	20	12
19	56	420	324	2080	26	16	16
21	78	396	280	2040	28	16	16
23	80	408	320	1980	24	18	16
25	84	464	340	2020	26	20	16
27	68	432	320	2040	24	16	10
29	72	412	310	1980	24	15	12
31	84	400	296	2040	28	16	16

(continued)

EPA-287 (Cin.)
(4-76)

TABLE A-70 (continued)

Date	Feed			MLSS	Effluent COD		Effluent Solids
	SS	COD					
		TOT	FIL		TOT	FIL	
November 1978							
2	40	410	296	1960	24	18	16
4	48	384	272	2020	24	16	12
6	36	362	296	1860	56	32	28
8	48	386	298	1760	62	36	36
10	36	386	284	1820	58	32	30
12				960			
13	72	346	244		76	29	46
14				1430			
15	52	381	299	1460	44	23	18
16	84	324	253		32	16	14
19	88	360	240	1810	20	20	9
20	52	312	228	1990	--	20	0
23	98	403	265		31	21	14
24	76	391	286	2610	28	24	6
27	0	241	228	2420	40	32	6
28	40	300	244	2450	32	32	5
December 1978							
1	62	360	248	2640	57	--	3
2	50	--	207	2770	51	57	1
5	162	428	209	3390	43	47	1
6	30	352	239	3400	34	38	0
9	70	364	257	3250	--	--	4
10	176			4480			4
13	124	500	308	3540	24	32	1
14	72	376	252	4040			2
15						40	
17	100	396	252	4480	36	32	0
18	100	396	252	4480	36	32	0
20	80	454	332	4100	20	36	0
21	68	408	280	4040	28	40	0
24				4200	--	53	0
30				3610			0
January 1979							
10				4780			0
16				4620			24

EPA-287 (Cin.)
(4-76)

TABLE A-71. DATA FOR 1,2 DICHLOROETHANE CONTINUOUS FLOW REACTOR-$\theta_c = 5$ DAYS

Date	Feed SS	Feed COD TOT	Feed COD FIL	MLSS	Effluent COD TOT	Effluent COD FIL	Effluent Solids
January 1979							
20	73	340	336	2760	144	124	20
21	126	500	352	2925	96	62	24
23	30	406	332	2100	92	84	10
24	43	304	236	1472	72	72	0
28	30	292	256	1245	48	28	18
30	38	300	240	1240	56	30	15
31	170	458	268	1115	48	40	25
February 1979							
1	80	446	344	1240	56	28	15
2	52	336	256	1230	88	68	25
4	128	530	348	1475	84	64	18
6	50	434	374	1375	86	80	0
8	55	476	400	1255	44	36	0
10	80	412	324	1320	68	36	20
12	108	464	318	1090	62	48	10
14	78	456	368	1485	84	62	40
16	60	416	352	1580	68	56	15
18	38	380	314	1580	72	52	15
20	60	404	336	1345	32	20	10
22	45	364	304	975	52	36	14
24	65	462	372	1455	72	48	15
26	73	360	308	1070	68	32	25
28	73	428	354	1615	46	44	0
March 1979							
2	65	452	368	1440	52	40	13
4	18	404	386	1510	36	32	4
6	115	452	342	1340	62	48	17
8	80	480	380	1380	40	40	0
10	92	424	318	1340	32	24	4
11	108	404	294	1440	220	48	142
13	73	468	340	1335	352	18	240
15	63	380	276	1090	128	20	80
17	105	500	344	1105	108	72	43
19	120	528	364	965	112	38	37
21	102	476	340	1175	120	0	80

(continued)

PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TABLE A-71 (continued)

Date	Feed			MLSS	Effluent COD		Effluent Solids
	SS	COD					
		TOT	FIL		TOT	FIL	
March 1979 (continued)							
23	55	396	320	1080	29	21	10
25	80	439	330	945	121	17	100
27	35	322	276	940	116	50	53
29	60	384	312	912	140	36	75
31	48	428	378	1017	128	32	68
April 1979							
1	108	312	244	810	164	44	88
2	20	344	304	927	176	60	83
4	70	456	364	925	136	56	68
6	30	404	364	1090	190	72	85
8	35	438	396	1180	120	74	33
10	50	452	388	912	248	80	148
12	70	376	300	1060	200	64	128
14	48	432	368	895	58	58	0
16	125	402	278	780	188	48	118
19	55	392	312	830	112	50	55
21	52	403	340	585	196	36	138
23	40	402	352	620	192	44	103

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3/8"
PAGE NUMBER

EPA-287 (Cin.)
(4-76)

TABLE A-72 DATA FOR 4-CHLORO, 3-METHYL PHENOL CONTINUOUS FLOW REACTOR θ_c = 5 DAYS

Date	Feed			MLSS	Effluent COD		Effluent Solids
	SS	COD					
		TOT	FIL		TOT	FIL	
January 1979							
22	80	432		1550	118	94	45
23	195	453		1660	106	98	14
25	75	371	269	1590	--	77	20
27	50	367	267	1605	61	55	--
29	70	348	248	1700	68	56	3
31	90	436	264	1710	112	72	35
February 1979							
2	120	437	279	1480	79	71	3
4	80	403	281	1400	63	59	4
6	76	405	294	1580	47	47	6
8	74	392	285	1500	64	48	4
10	150	528	280	2305	64	52	6
12	70	344	288	--	71	--	18
14	52	419	298	1255	84	69	0
16	100	444	292	1910	63	55	6
18	72	342	257	1425	49	45	7
20	80	435	300	2550	59	55	7
22	60	404	300	1330	--	60	0
24	128	516	316	1325	60	60	4
26	116	408	296	2976	68	60	11
28	95	396	280	3124	64	51	13
March 1979							
2	84	371	288	1740	65	57	9
4	108	376	306	1600	59	47	13
6	72	462	322	1048	53	47	18
8	100	500	348	1880	55	55	8
10	18	480	360	916	52	48	3
12	68	468	352	1292	80	68	7
14	88	440	344	1576	92	80	15
16	108	500	372	1460	64	43	17
18	108	552	374	1784	64	43	7
20	108	491	336	1570	60	46	4
22	88	501	380	2076	39	30	0
24	148	504	320	3308	44	36	0
26	80	408	290	2252	40	32	7

(continued)

TABLE A-72 (continued)

Date	Feed			MLSS	Effluent		Effluent Solids
	SS	COD			COD		
		TOT	FIL		TOT	FIL	
March 1979 (continued)							
28	76	500	376	1572	44	36	0
30	28	420	350	1658	45	40	0
April 1979							
1	36	394	328	1508	44	40	2
3	44	508	404	1490	71	65	6
5	36	530	423	1545	89	79	10
7	48	368	320	1520	72	52	37
9	76	388	308	1542	68	64	0
11	76	264	252	1896	120	112	48
13	48	432	342	1572	66	62	5
15	40	414	366	1654	42	42	7
18	60	436	372	1680	46	40	0
20	32	422	338	1452	38	30	2
22	44	464	396	1372	360	56	206

EPA-287 (Cin.)
(4-76)

TABLE A-73. DATA FOR 4-CHLORO, 3-METHYL PHENOL CONTINUOUS FLOW REACTOR EXTENDED AERATION

Date	Feed			MLSS	Effluent COD		Effluent Solids
	SS	COD TOT	COD FIL		TOT	FIL	
January 1979							
19	36	--	306	4540	--	61	0
22	--	--	--	4370	--	--	--
23	64	--	273	--	57	45	5
26	68	379	279	5027	59	37	6
28	48	336	245	5047	37	37	5
30	68	356	248	5000	44	44	4
31	84	272	240	4913	28	28	3
February 1979							
1	116	420	252	5207	40	38	8
3	124	445	283	5247	32	36	3
5	72	407	285	4913	32	34	1
7	76	403	283	4593	26	30	3
9	82	403	273	4640	20	20	4
11	64	544	280	4607	20	--	0
13	76	368	284	4567	40	--	10
15	56	403	294	4530	28	--	0
17	92	428	300	4650	34	34	6
19	80	360	273	4740	26	26	5
21	80	443	306	4860	34	34	7
23	56	396	292	4640	36	40	1
25	134	532	324	4900	32	28	5
27	108	408	272	4860	32	--	10
March 1979							
1	90	377	288	5150	30	32	7
3	68	383	288	4900	34	--	7
5	100	397	314	5067	32	32	7
7	84	453	322	5113	30	25	5
8	--	--	--	--	30	25	2
9	84	515	342	5220	30	34	5
11	76	476	272	5360	36	36	2
13	72	480	356	5580	44	36	2
15	72	440	344	5530	32	28	4
17	108	524	376	5720	31	6	7
19	112	556	385	5747	31	27	2
21	120	480	324	5667	21	18	0

(continued)

EPA-287 (Cin.)
(4-76)

TABLE A-73 (continued)

Date	Feed			MLSS	Effluent		Effluent Solids
	SS	COD			COD		
		TOT	FIL		TOT	FIL	
March 1979 (continued)							
23	80	485	336	5880	43	40	--
25	124	496	320	5550	12	20	0
27	76	364	320	5930	36	--	9
29	--	500	348	5551	--	--	0
31	32	413	384	5590	--	--	
April 1979							
2	32	388	327	6000	103	85	0
4	48	497	402	6180	49	85	4
6	40	512	429	6510	53	69	12
8	52	384	240	6480	--	40	0
10	80	432	252	6460	44	--	2
12	80	272	244	6580	112	100	3
14	52	388	358	6620	52	48	10
16	44	422	360	6690	74	34	14
19	60	430	364	6550	--	--	0
21	32	408	330	7150	26	24	2
23	44	452	364	6930	28	44	0

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3/8"

PAGE NUMBER
EPA-287 (Cin.)
(4-76)